The Electrical Industry's Weekly Magazine

July 30 1956

Electrical World

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for system operation employees of Appalachian Electric Power

TRAINING IS "PERPETUAL"

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E B POWER
UNIVERSITY MICROFILMS
313 N 1 ST
ANN ARBOR MICH

VALUABLE DATA is being supplied at G.E.'s Turbine-Generator Development Laboratory through full-scale testing of turbine and generator components. Above in the Laboratory, E. H. Miller, J. E. Downs, and C. E. Kilbourne, all of G.E.'s Large Steam Turbine-Generator Department, discuss plans to implement additional low-pressure steam path design concepts—a significant area of improvement in large size steam turbine-generators.

System economics pose the question—

How high will steam conditions go?

Knowledge gained from 4500 psig—1150 F developmental unit, and orders for machines up to 450,000 kw indicate the limit is still a long way off

The electric utility industry, confronted with spiralling fuel and labor costs, will watch with interest, the performance results of the first super-critical pressure turbine now being installed at American Gas & Electric System's Philo Station. Steam conditions are 4500 psig, 1150 F/1050 F/1000 F as compared with conventional conditions of 2400 psig, 1050 F of large units now going into service. Technical know-how gained from this developmental unit is already being applied, and considerable industry attention is now being focussed on several turbine-generators recently ordered having initial steam conditions of 3500 psig, 1050 F, with double reheat at 1050 F.

CONTINUING METALLURGICAL STUDIES are developing steels to handle tomorrow's steam conditions. Here, D. L. Newhouse, W. C. Hagel, and A. W. Rankin study materials used in super-critical pressure components of American Gas & Electric's No. 6 unit at the Philo Station.

These major technological advances promise to help the utility industry capitalize on margins for improvement still available in the steam cycle. Each, too, will provide significant answers to the question: "How high will steam conditions go?"

It has long been recognized that lower fuel consumption per kwhr through the use of higher steam pressures, higher temperatures and the reheat cycle is an important means of offsetting rising fuel costs. According to a recent G-E study, significant fuel savings appear possible from further increases in pressure and temperature up to 10,000 psig, 1450 F.

At General Electric, engineering developments in metallurgy and turbine-generator designs are under way to make possible new steam cycle advances and to help utilities meet the need for increased system efficiency. Progress must also be made in further development of those components affected by steam conditions to help make such machines engineering practicalities.

While percentage heat rate gains are smaller, the over-all dollar value of the fuel savings in large size units would be even greater than in the past, assuming a continuation of historic trends in fuel costs.

A copy of the recent study on advanced steam conditions, "Margins for Improvement of the Steam Cycle," may be obtained by writing General Electric Company, GER-1070, Schenectady 5, N. Y.

301-299

MORE POWER TO AMERICA

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• • •

COMING NEXT WEEK—Traditionally trees and distribution lines have been considered enemies. Today's more moderate attitude sees co-existence possible using modern cable and tree culture techniques. Next week EW will present details of modern tree practice in a 20-page report.

ABOUT THE FINER POINTS OF METERING...

For better protection against lightning surges

The most common cause of a watthour meter speeding up in service is that the damping magnets have lost some of their strength. Lightning surges and short circuits can de-magnetize even the best chrome steel magnets.

That's why Sangamo J2 Meters are equipped with small, powerful, highly surge-resistant *Alnico* damping magnets. These magnets are extremely stable because they are magnetically and heat aged. These better magnets provide the damping for the higher torque and lower speed of the Sangamo J2—your best investment in a watthour meter.

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At full nameplate rating, the J2's disk makes only 10 revolutions per minute. *This is many times slower than the disk speed of any other watthour meter on the market today.* And slow speed is *one* of the reasons why the J2 lasts longer . . . gives you more years of trouble-free service.

JM56-5

SANGAMO

ELECTRIC COMPANY Springfield, Illinois

EDITORIALS

It Takes More Than a Just Cause

There is a strong tendency among electric companies to adopt a course of action, then go to work. Any public announcement made about the action is liable to be perfunctory and almost certain to be secondary. This works well enough when it is a matter of expanding systems or meeting new loads. But it breaks down miserably when the course of action depends on public confidence and support.

The imposing need for an aggressive information program for building public support is vividly demonstrated by the power legislation which has come before Congress this year. Electric companies have, in each case—Hells Canyon, Niagara, and nuclear power development—offered constructive alternatives. The alternatives were offered soon enough and were generous enough to sidetrack each of the legislative proposals. Yet, partially because of an uninformed public, the federal and other public power advocates in Congress were able to turn them into political issues.

It is noteworthy that the reactor development bill and the Hells Canyon legislation both came within two years after electric companies had obtained favorable government action in these areas. The Atomic Energy Act of 1954 opened the way for free enterprise to develop nuclear power. Last year's Federal Power Commission license supposedly cleared the way for Idaho Power Co to develop Hells Canyon.

This legislative situation brings forceably to mind the advice which Charles E. Parker, president of Central Surveys, Inc, offered at the Edison Electric Institute convention this year. In his address, "As the Public Sees Us," this public opinion expert asserted:

"We cannot assume that a just cause will stand on its own merits, without interpreting and demonstrating those merits to the public. . . ."

And Parker warned:

"A dangerous assumption is that decisions are going to stand. When a decision is made that is favorable to the industry, we have, at times, forgotten the importance of reinforcing the decision by building public support for it."

Today's electric company management must accept and administer its public relations responsibilities with the same care it devotes to its other responsibilities. The lessons implicit in the legislation before Congress this year, the Dixon-Yates situation of last year, and the Tennessee Valley Authority steam plant fight of 1949 are too costly to bear repetition. Parker's counsel is both wise and timely.

Is There Any Glamor in Steam?

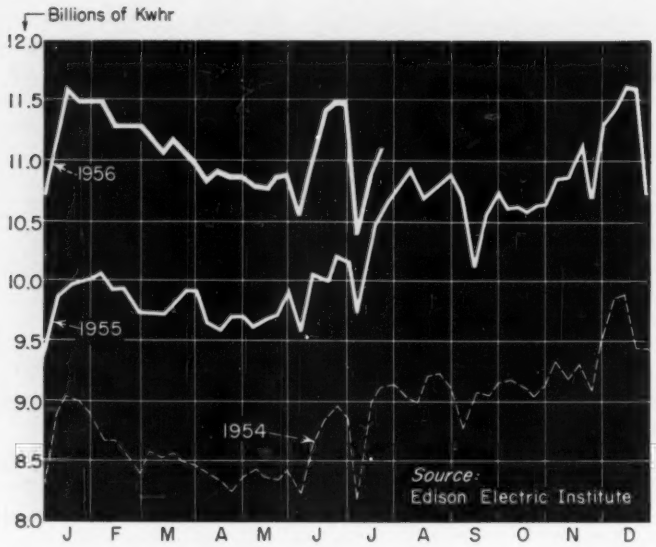
Falling water, whether over Niagara Falls or Hoover Dam, has always been alluring to the average citizen. Popular magazines usually illustrate their articles on power with pictures of Hoover Dam or Grand Coulee Dam in flood season. Even ordinary creeks, rivers, and lakes are associated with romance. Songs have been written about many of them, but who ever heard of a song about steam?

Public relations men who have tried to glamorize a steam plant recognize this. An occasional open house well-advertised is usually successful. But the day-to-day drawing power is nil.

A good example is the experience of the Tennessee Valley Authority which has both hydro and steam plants. Last June it had 1,147,150 visitors at its 25 installations. Kentucky Dam, with 220,000 hp of water power, was top attraction with 255,000 visitors. Shawnee, a 1,266,300-hp steam plant, drew 150.

Of course, location and recreational facilities played a part. But the 14 top attractions were hydro dams; the bottom six were steam plants. Ranking fifteenth was the 2 million-hp Kingston Plant, top attraction of seven steam plants.

Water has the glamor, but water's glamor evaporates as the water turns to steam. Companies having only steam generating plants might as well recognize the inevitable. They have no glamor. Or is there a public relations man somewhere in the industry who can find glamor with which to thrill the public in a multi-million dollar steam plant bringing a higher standard of living to our homes?



OUTPUT

Week ended July 21
11,125,000,000 Kwhr
Up 4.8%

Atomic Energy Commission requirements—1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 4.0%

Per Cent Change From Previous Yea

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
July 21	+4.8	+2.3	−4.7	+0.3	+0.1	+7.6	+23.2	+11.6	+13.0	+5.9
July 14	+4.2	+5.3	+0.4	−0.2	+9.9	+6.4	+11.3	+9.8	+11.8	+6.4
July 7	+6.5	+6.3	+0.2	+3.1	+4.5	+7.4	+17.2	+13.1	+12.4	+8.6

Seasonally Adjusted Index 210.3 Week Ago 209.5 Year Ago 201.5

Issue's Highlights . . . What's Rep Earl Chudoff (D-Pa.) after? EW's penetrating story focuses attention on possible motives . . . NEMA's hydraulic turbine section petitions ODM for all turbine orders placed by federal government . . . Gore Bill defeated in House but six power bills await action by Congress before adjournment . . . SEC misconstrues section of Holding Company Act . . . Fly-ash meeting called by EW to find ways of getting at possible $200-million market . . . AGE will sell no common stock through 1960 . . . Massachusetts Senate uproots tree-trimming bill aimed at hurricanes . . . Portland GE Co will spend $500,000 on migrating fish during Pelton Dam construction . . . AEP gives "perpetual training" to keep employees up-to-date . . . High-speed dryers on urban lines and loads not much different from standard clothes dryers . . . Grant County PUD lets $91-million contract for Priest Rapids 630,000-kw dam.

Fire in a coal bunker at AG&E's Sporn plant triggered explosion in coal tripper room which demolished upwards ot 200 ft of room's outside wall. Falling bricks and other debris damaged machine shop, office, cafeteria, other facilities. Two employees were hospitalized for serious burns, two others slightly injured. Preliminary estimates place damage at $200,000, covered by insurance. No. 2 unit, rated 137.5 Mw, was curtailed temporarily.

Harriam Ripley & Co and Glore, Forgan & Co groups win $20-million Illinois Power first mortgage 3¾% bonds (Aa) due 1986 with bid of 100.304; reoffers at 100.90 to yield 3.70% . . . H. K. Porter Co buys Electric Service Manufacturing Co, Philadelphia . . . I-T-E Circuit Breaker Co acquires Kelman Electric & Manufacturing Co, Los Angeles.

Atomic Energy Commission sets up competitive bidding system for leasing uranium deposits on withdrawn public lands and areas under AEC control.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire . . . Pacific Northwest Power will have spent $1.8 million by Sept. 1 for preliminary engineering studies on Mountain Sheep-Pleasant Valley projects, company officials told FPC. Technical hearings began in Washington last week on company's license application. Washington WP's Pres Kinsey Robinson, who is also PNWP's president, told FPC examiner the proposed 1,183,000-kw, $213-million hydro project "is feasible, economical, and geographically well located for coordinated operation with Northwest power pool." PNWP's application is being opposed by National Hells Canyon Association and other public power groups. Robinson has pointed out that no other agency, federal or otherwise, has indicated intention of building at the Mountain Sheep-Pleasant Valley sites.

"I think it is a good thing that we have privately owned utilities that have benefits of private capital," San Francisco's Mayor George Christopher declared at NARUC in San Francisco last week. He was praising "tremendous and great" job done by Pacific G&E and Pacific T&T in meeting California's population growth problems . . . NARUC Pres Benjamin Feinberg asked how rapid obsolescence of depreciating nuclear plants would be treated, and how ratepayer and stockholder would share in this experience. Long-range thinking is needed, he warned. Atomic power generation likely will cost more at first than conventionally generated power, but should drop with increase in design and operating experience. Explosion risk is greatly magnified in minds of a jittery, distrustful public which also has vast misconceptions about atom power rates. Feinberg praised utilities for being alert to the commercial potential of the atom and for not letting grass grow under their feet before starting atomic power projects.

A unique new cooling system will be used on a 400,000-kva main power transformer installation at Philadelphia Electric Co's new Eddystone Station, now being built. The scheme uses two transformers connected to a common forced-oil manifold cooling system equipped with heat exchangers. Allis-Chalmers, who introduced the scheme, says it lets one transformer of the pair carry a major portion of the two units indefinitely with no increase in temperature.

ABOUT PEOPLE IN THE INDUSTRY

Strewing flowers "on the grave of the Hells Canyon issue," Washington's Gov Arthur B. Langlie opened his campaign for Senate against Sen Warren G. Magnuson in Spokane. He asked, "Do you want the kind of government our President has mapped out, or do you want to return to deficit financing . . . The least government is the best government," he added, "and the one thing to fear is big government."

Oregon's Gov Elmo Smith steps forward in support of Idaho Power's FPC license for development of Hells Canyon. A candidate for the post he assumed on death of Gov Paul Patterson, Smith declares: "The need for power in the Northwest is critical. Power will start flowing into transmission lines of the Northwest power pool from Brownlee Dam within two years unless construction is interrupted."

More News About People page 36

CHUDOFF: DIRECTS THE SHOW

JONAS: WATCHES CRITICALLY

HOFFMAN: PREDICTS A FARCE

What's Earl Chudoff After?

Personal fame? Evidence of a conspiracy of 6 utilities? Or does he hope to further the socialization of the power industry?

Some of his committee members are wondering . . .

What's Rep Earl Chudoff after? What's driving this Pennsylvania Democrat in his investigation of the electric utility industry?

This is a question that anyone in the industry may well ponder.

Apparently some members of Chudoff's own House subcommittee are wondering the same thing—particularly his vigorous minority opponents who seem to have a hard time finding out what's going on.

Certainly Arizona Public Service Co, Idaho Power Co, Montana Power Co, Utah Power & Light Co, Public Service Co of Colorado, and Ebasco Services, Inc., are curious to know the answer too. That group is being "investigated" for its "organized effort . . . to influence the Secretary of the Interior . . ." through a booklet (published three years ago) which attacks the federal power program.

What is Chudoff after? Perhaps he honestly believes some basic American endowment has been violated, despite constitutional guarantees of freedom of speech and press.

Or perhaps he hopes to achieve fame that may work to his political advantage. Or perhaps his goal is not clearly defined in his own mind. Sometimes it appears he is searching—desperately at times—for something conspiratorial to uncover but will not admit that no such condition exists.

Although his motives are probably known only by himself, after the first week of hearings, this much was clear to Washington observers:

1. Chudoff's "organized" effort on the part of the companies consisted of joint sponsorship of a booklet: "The Federal Power Program . . . Its Background, Growth, and Consequences."

2. Chudoff was hoping to establish undue influence of Ebasco Services, Inc.

3. If the hearings are to set a future pattern and precedent for the Democratic attack on the electric industry, it means the threat of investigation hangs over every electric company which has ever:

- Singly sponsored any public or employee information booklet explaining or criticizing federal power policies.
- Jointly sponsored with other companies a similar booklet.
- Participated in any industry association that may have sponsored such a booklet.
- Belonged to any industry program that has sponsored such a booklet.

And there is no reason to doubt that this investigatory zeal wouldn't extend perhaps to house organs too someday.

Former Probe Bred This One

Chudoff himself has pointed out that the current investigation is an outgrowth of his previous investigation which culminated in a 254-page Democratic majority report considered so biased that even two Democrats took exception to it. (The report covered the Eisenhower Administration's alleged efforts of "fostering private monopoly" in the power field. EW, June 18, p 16.) In this majority report he recommended:

"Congress launch a full-scale joint investigation by both Houses to determine whether there is an organized effort of the private power companies to influence the federal Administration, the Congress, the governments of the states, and the political life of the nation."

There is little that could not be included in "political life of the nation."

Jonas Spots Inconsistency

Chudoff already has been pegged as inconsistent.

"I notice," said Rep Charles R. Jonas (R-N. C.), "you are swearing all these witnesses. I point out that throughout our hearings last year, when you were hearing those that were attacking the Administration, you never swore a single witness."

Chudoff admitted the discrepancy, but offered no explanation.

"Indicates to me some discrimination," Jonas remarked.

The minority got off to a fiery start by issuing a blistering opening statement. It left no doubt about what they thought of the current hearing. It said they had been kept in the dark on the investigation that preceded the hearing—they had no idea what the charges were, and they had seen none of the documents that had been subpoenaed.

"Reprehensible as it is, it is true that you have already been convicted," they told company witnesses. "We were naive enough to believe that a man—or even a power company—was innocent until proven guilty. It seems we were wrong."

Ebasco Drawn In

Majority questioning of company witnesses went into minute detail concerning the booklet. Who had written it? When had the idea been conceived? Who was at the meeting? Why hadn't the five sponsors been listed? Why hadn't Ebasco Services been listed? Who had ordered the research done by Ebasco? Why had they gone to Ebasco for the work? How was Ebasco first contacted? How much time was spent with the Ebasco people? Who had paid for the booklet? How was the payment split among sponsors? How were these costs charged by the companies . . . and so on, and on.

Rep Clare E. Hoffman (R-Mich.) attempted to shorten the drawn-out questioning by suggesting that the committee request the company sponsors of the book to get together and agree to admit for the record that they had sponsored and paid for the book. But Chudoff would have none of that.

James A. Lanigan, majority counsel, probed at length speeches made by Montana Power's Pres J. E. Corette. Did Ebasco help prepare these speeches? Did Ebasco supply Montana Power with topics for speeches? Had Montana Power ever used an Ebasco outline in preparing a speech?

After that subject was raked over the coals, C. N. Phillips, director of Ebasco's research department, was questioned about a speech—one made by John T. Kimball, vice-president, Idaho Power, entitled "A Proposal for a National Power Policy." Part of the talk had been inserted in the back of the booklet.

Jonas objected to the drawn-out questioning, saying Lanigan could make his point in 15 minutes if he wished to shorten the session.

(*Continued on page* 10)

U.S. Turbine Makers Protest

NEMA's Hydraulic Turbine Section petitions ODM for permanent exemption to Buy American Act to stop foreign firms from supplying equipment to government

U.S. hydraulic turbine manufacturers have called on the United States government to confine its purchases of hydraulic turbines to American suppliers.

The Office of Defense Mobilization has made public a petition by domestic manufacturers setting forth their arguments. The petition comes from the Hydraulic Turbine Section of the National Electrical Manufacturers Association.

Members of this section are: Allis-Chalmers Manufacturing Co, Baldwin-Lima-Hamilton Corp, James Leffel & Co, Newport News Shipbuilding & Drydock Co, S. Morgan Smith Co, and Woodward Governor Co. The companies claim they represent more than 95% of the total U. S. production of hydraulic turbines.

Federal Orders Essential

They maintain that their continued existence is dependent upon government purchases because the government takes about 75% of all domestic hydraulic turbine bookings. And foreign manufacturers can underbid domestic producers "at will," they say.

Last February, ODM set up an interagency committee composed of the Department of Defense, State, Interior, Commerce, and others to make a recommendation on the Buy-American policy.

American producers are asking that a permanent exception be made to the Buy-American Act ruling out foreign suppliers of hydro turbines. Right now, foreign producers can bid on federal projects, but American firms get a 6% price differential in their favor. At the same time, agency heads can rule out a low foreign bid on grounds of national security, if they wish. Defense Secretary Charles E. Wilson did this in the case of a low bid by English Electric, Ltd, for a generator for the Chief Joseph Dam.

The companies in their petition argued that existence of their industry is essential to defense and to the servicing of hydro installations quickly in the event of war damage.

They cited bids on hydraulic turbine installations in the U.S. back to 1950 to show the price differential between domestic and foreign manufacture. Although one order in that time went to a foreign firm, bids ranged 2.5% to 55.8% below the American bids.

Currently, an English firm is low bidder on the Army's Fort Gaines project on an order involving around $2.5 million. No contract has been awarded yet.

The economic advantages available to the foreign manufacturer through a low wage structure permits him to underbid U.S. manufacturers here at will, say the companies. They also note that the foreign supplier is exempt from various provisions of important federal laws.

Domestic producers also point to their position in the export market in the face of foreign competition. They report 1954-55 export bookings of $1,237,667, lowest figure since 1940-41 when bookings were $2,793,588. "The number of units sold in 1954-55 was less than any biannual period beginning with 1936-37 and was only three more units than were sold in 1932-33," they report.

It is believed that the interagency group might recommend to ODM Director Chief Arthur S. Flemming that each case in the future be considered individually.

Gas Turbine Plant to Aid Hydro on Vancouver Island

British Columbia Power Commission is erecting one of the largest gas turbine plants of its type in the world. To be situated on Bare Point (near Chemainus), Vancouver Island, the plant will cost $13.3 million and will have four machines which will supplement hydro electric sources on the island at peak load times and during low water supply periods.

This will be the second largest development of the Commission, ranking behind the 168,000-hp John Hart hydro station at Campbell River, Vancouver Island. The new plant will have 100,000-hp generating capacity.

Chudoff Hearings

(*Continued from page 9*)

Hoffman said it all boiled down to whether the companies were operating within their constitutional rights and whether they had done anything illegal or unethical in issuing the booklet. There was no dispute about what the companies had done. They admitted publishing the booklet.

"Why are we doing all this?" Hoffman demanded. He turned to Lanigan: "This is just providing a forum for you to air your views on socialism—and you have been for some time."

When Phillips attempted to explain the mechanics of writing a speech at the request of a client, Chudoff interrupted to say: "This is a fact-finding committee. You are not on trial. You don't have to give explanations."

"This is a propaganda forum," Hoffman contradicted.

Rep Victor A. Knox (R-Mich.) remarked dryly that Phillips testimony led him to believe that Ebasco was a lawful free-enterprise group and that its services are available to public bodies too if the fees are paid.

Hoffman has already made two barbed speeches against the hearings on the House floor. He noted the power companies "frankly admit" hiring Ebasco's experts to put out literature in an effort to obtain interpretations of existing law which would be favorable to them. "As I understand it," Hoffman continued, "they have the right to do just what they did."

Although not mentioning him by name, Hoffman singled out Lanigan because he "is trying to frighten them (the utilities) and establish socialism. . . What is the use of talking about civil rights when this kind of a hearing is carried on by a Congressional committee?"

Rep G. A. Dondero (R-Mich.) inquired if the hearings were based on legislation.

"Oh no," Hoffman retorted. "It is instigated by the desire of this particular staff employee to socialize the power industry."

There "ought to be something in the Civil Rights bill to stop that kind of proceeding," he added.

He finished by inviting "some of you gentlemen who believe in constitutional government" to come and "enjoy" one of the committee hearings.

"If you want to see a farce, go to the next one," he snapped.

House Rejects Gore Atom Bill

. . . by 203-191 vote, eliminates $400-million appropriation; six other power measures set for last days of Congress

Despite the so-called efforts of its sponsors and drafters to keep the Gore Reactor bill from becoming a political issue, it did just that in the closing days of Congress.

The Democrat-backed measure, which called for federal construction and operation of nuclear reactors for commercial power, was rejected 203-191 last week by the House after previously passing the Senate. House sent the bill back to Joint Atomic Energy Committee and also voted elimination of a $400-million appropriation for the proposed program. Revised appropriation bill, including $1.9 billion for other Atomic Energy Commission activities and $3.2 million for hydroelectric projects operated by Interior Department, was passed and sent to the Senate.

First appearances of a relatively trouble-free passage for the measure were deceptive. A gloves-off attitude was disclosed with issuance of a report from Chairman Clarence Cannon (D-Mo.) of the House Appropriations Committee. Cannon accused Atomic Energy Commission Chairman Lewis Strauss and the AEC of retarding atomic electric power development to the point of "national crisis."

The program, he added, "is bogged down in inexcusable stagnation." Cannon's strongest language was aimed at Strauss. His only kind remarks were reserved for AEC Commissioner Thomas E. Murray, who has endorsed federal construction of nuclear power plants.

Cannon said evidence showed this country is three years behind the English and Russians in atomic power development and that "these three years coincide with the re-entry of Mr Strauss into a position of dominating influence in the atomic energy field. . ."

Report Stirs Republicans

Unquestionably Cannon's report had the effect of forcing any doubtful Republicans to oppose the measure in defense of the Administration and AEC. At the same time, coal miners have strongly opposed the measure as subsidizing a competing fuel. Consequently, a number of Democrats from coal areas were against the bill.

Rep W. Sterling Cole (R-N. Y.) introduced two amendments to the watered down Gore Bill. One would permit AEC to accept private capital in financing its power plants, if private capital is willing. The other would specify that the accelerated program could in no way interfere with AEC's existing weapons-reactor program.

It seemed clear that the Gore measure would remain a political issue for the Democrats in the fall election campaign.

Cannon showed this in his questioning of the Electric Companies Advertising Program representatives for the atomic power advertisement; in raising in his report a "conflict of interest" question with regard to Walker Cisler, Detroit Edison Co president; and in his charge that AEC has become "involved in politics."

Other Power Bills Await Action

In other major legislation this was the last-minute picture:

Eight Democrats crossed party lines to swing the Hells Canyon Senate vote that gave the Administration's partnership policy one of its major victories to date.

Closely tied to the Hells Canyon action was the future of the Fryingpan-Arkansas project. This Senate-passed $156-million multi-purpose project in Colorado figured in the reports of vote swapping. The outcome for this project now is in doubt, particularly in view of a House Rules Committee refusal to clear the bill for action. The vote was a 5-5 tie.

Niagara: passed by Senate, but time may run out before the House can act.

Atomic liability insurance and holding company exemption: both cleared for Senate-House action.

Barrett water rights bill: contains the Neuberger amendment which would cancel the FPC license to Portland General Electric Co for its Pelton hydro project. It has been adopted by Senate Interior Committee but has not yet been reported on the House side.

Southwestern Power Administration: House Rules Committee sent to the House the Senate-passed bill to freeze rates until July 1, 1957.

WHAT

BLACKBURN

HAS

UP

ITS

SLEEVE!

Blackburn Compression Service Entrance Sleeves Feature

- Body of highly conductive aluminum that fits all standard compression tools. Can be used for all combinations of aluminum ACSR and copper conductors.
- Bores of each tube are filled with CONTAX, a mineral base grease with metallic and abrasive particles held in suspension. It has an ASTM drop point of 549° F.—improves conductivity—prevents corrosion.
- Solid metal barrier between bores assures even distribution of CONTAX all around conductors when crimps are made.
- Push conductor through thin wall, color coded caps—no need to remove them before inserting conductor—they do not interfere with installing die. Colors will not run or fade. Sizes cover a wide range of conductor combinations.

Available at Electrical Wholesalers Everywhere.
Wire or write for bulletin on Blackburn Compression Fittings.

JASPER BLACKBURN CORPORATION 35 MADISON ST. • ST. LOUIS 6, MO. • PHONE MAIN 1-2821

L-M's Round-Wound transformers provide more capacity for heavier short-time overload without sacrifice in transformer life. Because L-M's obround design is lighter, smaller, and has less bending moment than round tank design, three 167's can be hung on a two-pole structure in place of three 100 kva transformers of older design.

For Heavier Commercial Loading

Why L-M Round-Wound® Transformers

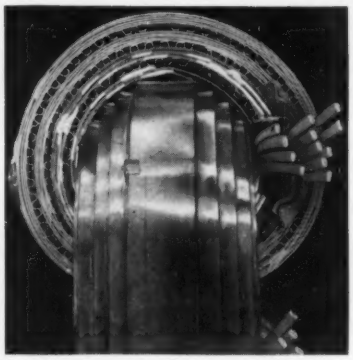
Core-type construction with cruciform cross-section core and round coils provides the most efficient design for lower hot-spot gradient, greater capacity for short-time overload.

By **ROBERT P. THOMPSON**
Manager of Engineering
Transformers
Line Material Company

One of the primary factors that limit the overload capacity of a transformer is the efficiency with which heat from the coils can be dissipated into the transformer oil. Particular care was taken, therefore, in the design of L-M Round-Wound transformers, to assure greatest exposure of coil surface area to cooling oil, and least obstruction to oil circulation.

Cruciform Cross-Section Core

The core is wound of a continuous strip of oriented steel, of varying widths, to form a core of nearly round cruciform cross section. The cruciform cross section of the core provides natural oil passages for cooling between core and coils.



Natural oil passages between cruciform core and round coil help to dissipate the heat from the coils more rapidly. In addition, ducts between windings and between layers in most sizes provide additional oil circulation.

Round Coils and Cooling Ducts

L-M's long round coils expose a relatively large and highly efficient area to cooling oil. Because of this, they provide greater overload capacity than rectangular coil types. In addition, ducts are provided for oil passages between windings and between layers in most sizes, giving exceptionally uniform cooling for the coils.

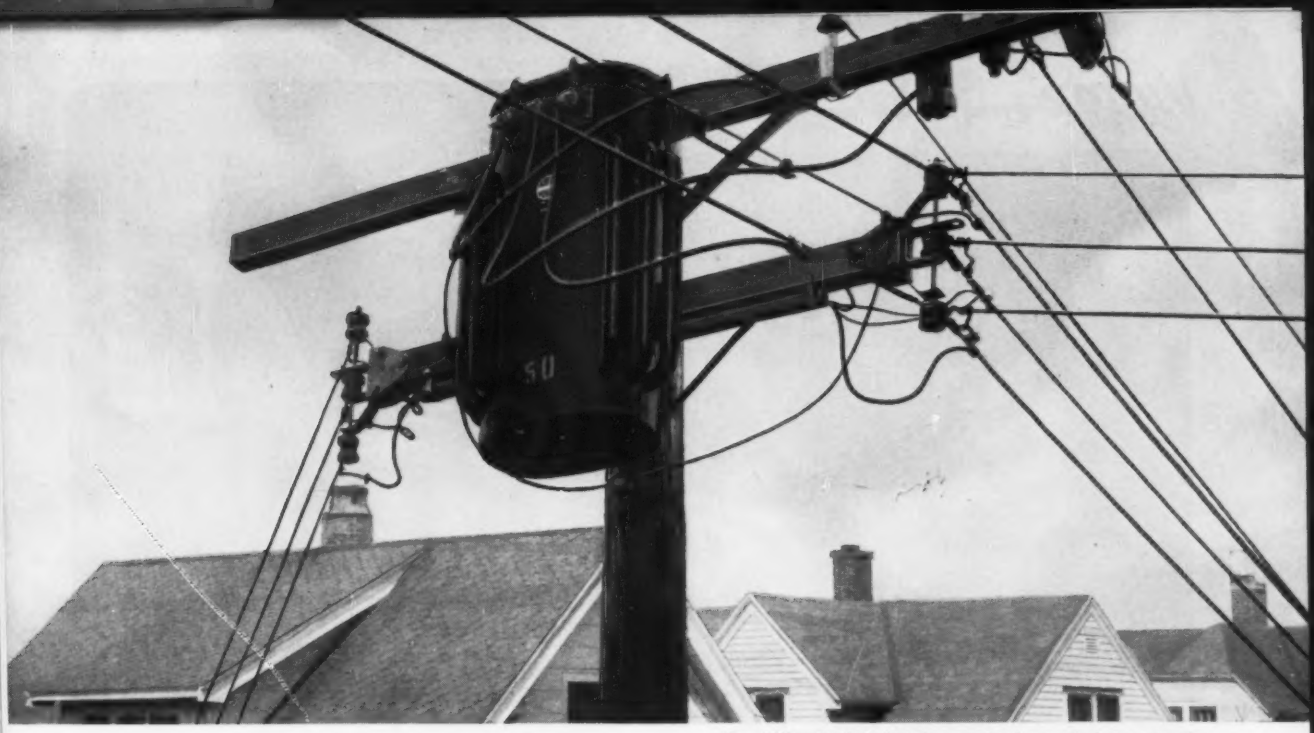
Core-Type Construction

In comparison with shell-type construction, L-M's core-type Round-Wound transformer has greater outer coil surface exposed to cooling oil; therefore coils are cooled more rapidly and uniformly. The cooling surfaces of shell types are partly blanketed by core steel; oil circulation is more obstructed.

Lower Hot-Spot Temperature, Higher Overload Capacity

Because L-M's Round-Wound design provides more efficient dissipation of heat from the coils to the oil, it has appreciably lower hot-spot temperatures during overload. This permits higher short-time overload, or longer overload periods, or greatly increased over-all life of the transformer.

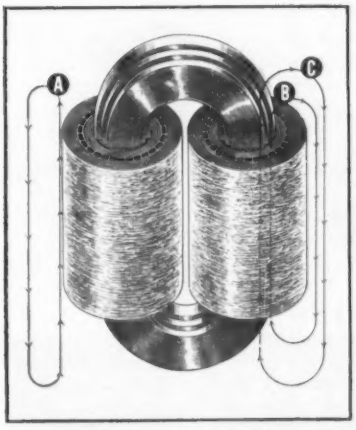
LINE MATERIAL
A McGRAW ELECTRIC COMPANY DIVISION



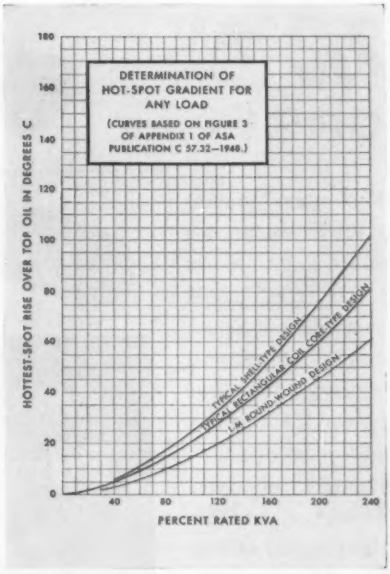
Round-Wound's high short-time overload capacity helps solve the more difficult *summer* overload problems in residential areas. The efficient cooling system in L-M transformers keeps hot-spot temperatures lower under high short-time overloads, increasing the capacity for overload and reducing the possibility of insulation damage.

For Heavier Residential Loading

Have Higher Overload Capacity



Because L-M transformers expose large, unobstructed areas to cooling oil on the outside of the coil (A), between core and coil (B), and between windings and layers (C), heat is dissipated into oil more rapidly and uniformly during overloads.



The higher the gradient at rated load, the more rapid is the rate of increase in the gradient with overload. Note that L-M's Round-Wound transformer, with a lower temperature differential (gradient) between hot-spot and top oil at rated load, has a greater capacity for overload.

Get Complete Information

Ask your L-M Field Engineer for complete information on L-M's Round-Wound design, and bulletins. Or write Mr. Thompson at Line Material Company, Transformer Division, Zanesville, Ohio.

Five Reasons Why More Customers Are Selecting L-M Round-Wound Transformers

1. Higher Uniform Impulse Level: Round coils are *wound* into shape. Therefore insulation is not damaged by malleting into rectangular shape. Coils have longer creepage distance between windings and between leads.

2. Higher Short-Circuit Strength: Round coils are not stressed out of shape under high radial short-circuit forces. Strong steel frame, heavy clamping bolts, sturdy maple blocks and varnished coils prevent axial movement.

3. Higher Short-Time Overload Capacity: Round coils and the cruciform cross-section core expose large surfaces to cooling oil. The result is relatively low hot-spot temperatures, which add considerably to high short-time overload capacity.

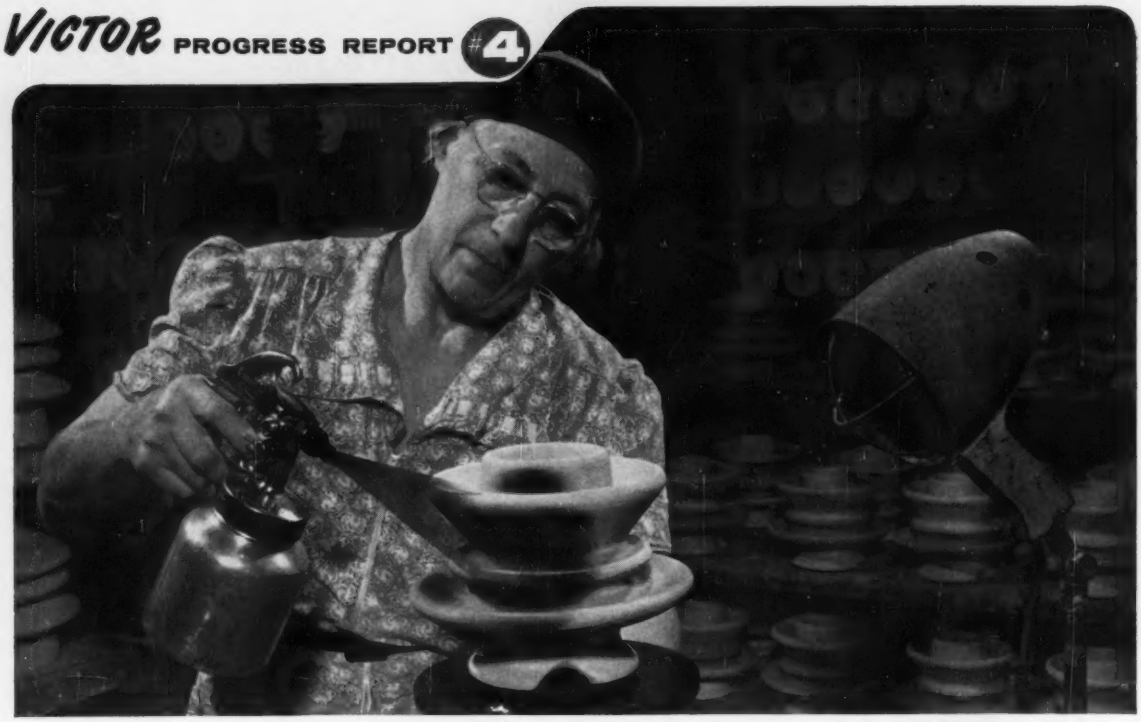
4. Balanced Performance: The core is a continuous wound strip of oriented steel. Coils are wound directly onto this core. Since the core is not cut, unwound, or disturbed in any way after annealing, there are no air gaps to break up the flux path. This results in low exciting current and core loss.

The wound-core, round-coil design permits fewer winding turns and smaller turn diameter. This results in low impedance, and provides better regulation at all power factors.

5. Additional Capacity on Pole: L-M's new obround tank design makes the unit smaller and lighter, with shorter moment arm from the pole. This combination reduces the bending moment on the pole and crossarms, and thus greatly increases the potential capacity of existing transformer structures.

Transformers

VICTOR PROGRESS REPORT #4



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SPECIFY VICTOR

Purified Porcelain Insulators!

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Tree Bill Gets the Ax

In a surprise move, the Massachusetts Senate killed the House-passed bill that would have empowered municipal tree wardens to authorize cutting, trimming, or removal of trees which interfere with utility power lines.

Aimed at improving electric service during hurricanes, the bill had swept easily through the House. Pleas to the Senate from "tree-loving groups" were believed to have defeated the bill. One observer said that the measure probably would have stood a 50-50 chance if utilities had pressed more vigorously for its enactment. It was felt, however, that the measure may be reconsidered next year.

In another effort at improving service during storms, a special legislative commission has been studying the feasibility of forcing Massachusetts utilities "underground." But the commission could find no similar law in any state. The commission reported unfavorably on the proposal, pointing out that a complete conversion would cost $800 per capita, plus high connection charges for customers. The commission urged greater use of aerial cable instead.

Happy Ending for a PUD

Here's part of what has happened in Stevens County, Wash., after the residents voted to sell their PUD to Washington Water Power Co:

From Dec. 1, 1955, through March 1956, appliance sales ran 27% ahead in the county over the same period the year before. Freezer sales jumped 40%, electric washers increased 36%, radios climbed 28%, and electrical housewares rose 34%.

WWP Co reports that 1,819 residential and rural customers were billed $7,582 less during the first normal month of WWP service than they would have paid under PUD rates.

Electric Tablecloth for Queen

An electrified tablecloth, reports a London newspaper, has been invented by the Duke of Edinburgh. The 58-foot "cloth," made of "hundreds of yards of wire sandwiched between layers of felt and latex," was designed to enable Queen Elizabeth to insert electric candelabra into the tablecloth of Britannia, the royal yacht, without wires showing. Each candelabra base has two small pins which plug into the wires.

Computer Group Formed

A research group has been formed to explore the possibilities of electronic computer systems fully with respect to solving operating and engineering problems in the utility field. Participants in the group include Arizona Public Service Co, American & Foreign Power Co, and Remington Rand, Inc.

Headquarters will be in Phoenix where Arizona PS is to construct a $246,599 air-conditioning building to house its $1-million electric computer now on order. One side of the computer room will feature floor-to-ceiling glass and a public observatory gallery.

Fish and Pelton Dam

Portland General Electric Co will spend more than $500,000 to protect migrating fish during construction of Pelton Dam on the Deschutes River, reports Gen O. E. Walsh, vice-president. Facilities now being installed will collect fish below the project site and carry them to a release point above the construction area.

A picket barrier about three miles below the dam, a 100-ft-long fish ladder leading to a Buckley-type fish trap, and a specially designed tank truck are part of the equipment. The tank truck will carry fish from the trap to the release point. Physical facilities will cost $330,000, and operation and maintenance for the 2-yr construction period will run about $200,000. Walsh said the facilities have been approved by the Federal Power Commission after review by Oregon's fish and game commissions and the U.S. Fish and Wildlife Service.

Utility, AEC Sign Atom Pact

Niagara Mohawk Power Corp and the Atomic Energy Commission have signed an agreement by which the utility will take power at 3 mills a kwhr generated by the Commission's experimental reactor at West Milton, N. Y.

The power had been offered to preference groups previously: The City of Holyoke, Mass., and the Village of Ilion, N. Y. But transmission arrangements could not be worked out. However the Commission still is empowered to negotiate with the preference customers if and when they are able to take power at the West Milton bus bar. (The reactor is a prototype for the Navy's nuclear submarine, the Seawolf. It generates power intermittently.)

Electric Garbage Collections

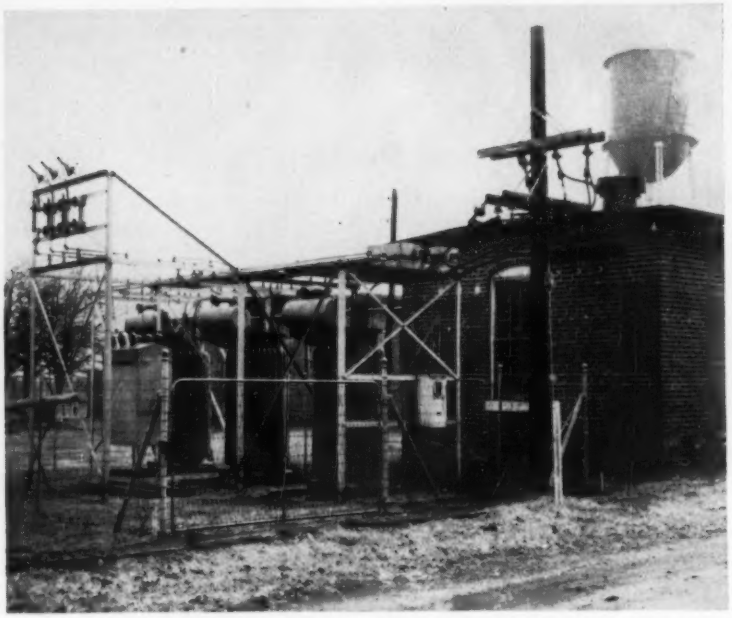
In a big effort to cut the $5.65-million job of collecting garbage, the city government of Detroit (pop. 1,849,568) is pushing a plan to get a garbage grinder unit to every house in the city. Results now are beginning to show. About 42,000 units have been installed, and new ones are going in at about 1,000 a month. A new campaign, however, is expected to raise installation to 15,000 a month within the next year or so. A city ordinance requires all new houses to have disposers.

Standardized Designs Cut Costs

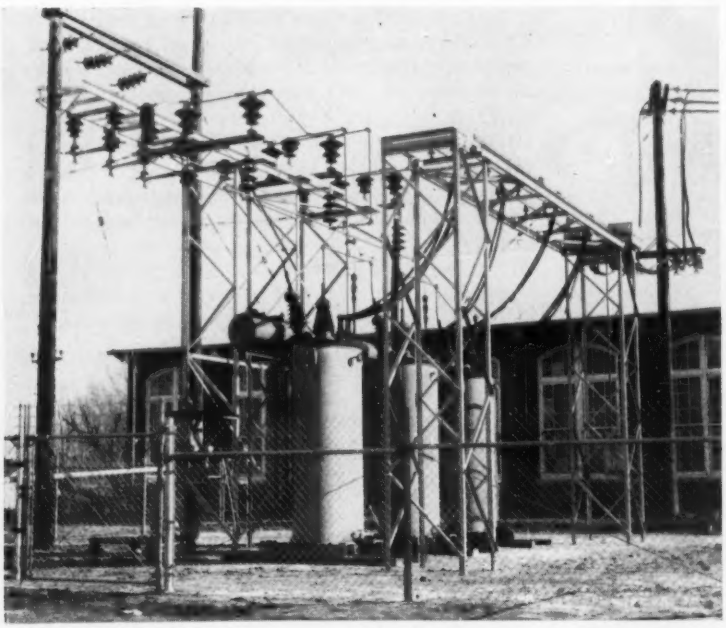
SUBSTATIONS
Design

Duke Power employs 3 simliar substation setups for supplying large power needs to save both materials and time

W. K. HARDING, Substation Engineer,
G. G. MATTISON, Assistant Superintendent of Electrical Maintenance & Construction, Duke Power Co, Charlotte, N. C.



SMALLEST SUBSTATIONS follow pattern of the above. Such unit has oil circuit breakers on high-side of transformer only when overload protection is needed



INTERMEDIATE-SIZE SUBSTATIONS are designed like the unit shown above and have current transformers mounted on the bases of high-voltage air-break switches

Standardization of designs and installation practices cut Duke Power Co's costs by an estimated 25% per substation structure. The cut results from reduced engineering and construction time, elimination of errors, and simplification of purchasing. Moreover, standardization minimizes waste by permitting reuse of most materials.

Have Same Components

Three general types of substations, containing essentially the same basic components, supply Duke Power customers. Components are:

1. A galvanized steel substation structure.

2. Three single-phase transformers with a 3-phase overload interrupting device on the high side.

3. Three single-pole single-throw high-voltage disconnects on the incoming line.

4. Metering equipment on the low-voltage bus.

1,500 Kva Is Limit

The smallest substation is applied to loads up to 1,500 kva when primary voltage is 2.4 or 7.2 kv and secondary 220, 440, or 550 v. Its structure is assembled by bolting together prefabricated angles to form four 7½-ft square bays, having a deck elevation of 10 ft above ground. The 1,480-lb steel structure can be purchased for about 75% of the cost of the same structure made of pipe and clamp fittings. Weight of the heaviest steel member is 85 lb which minimizes construction labor.

Column footings are angle stubs set in 8-in. diam holes filled with concrete. This saves the cost of forms for concrete piers with anchor bolts. There are no errors in stub alignment when stubs are bolted to the above-ground structure before concrete is poured.

Only at generating stations are concrete pads used for transformer foundations. Substation structure foundations are creosoted crossties imbedded

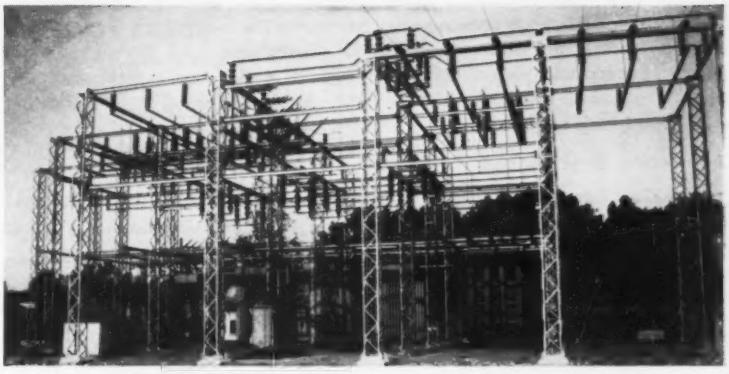
in crushed stone. The area is excavated to hard pan to a minimum depth of 12 in. and backfilled with 1½-in. crushed stone. Standard creosoted crossties are imbedded so that the top surface is 3 in. above ground level. Crosstie spacing varies with transformer size. When a substation must be relocated, the only loss in concrete is the small amount around stub footings.

Structure Has Two Units

The intermediate-size substation is for capacities up to 6 Mva where primary voltage is 13.8 to 46 kv. Its structure is of two separate steel frames: One for the automatic high-voltage air-gap switch, 20 ft high and 16 ft long; and the other for low-voltage bus and metering, 17 ft high and 27 ft long.

Midway between the structures are three single-phase transformers. A spare transformer for a wye-connected bank can be installed opposite the low-voltage structure. Its low-tension leads are as long as those of the permanent units. High-voltage connections between the switch and spare transformer are supported by a 2½-ft high rack bolted to the top of the low-voltage structure.

Foundations are the same as those for the smallest substation except that transformers heavier than 18,000 lb are on railroad rails fastened across the ties for better weight distribution.



LARGEST SUBSTATION has galvanized steel columns that are spaced 22 ft on centers in order to provide the necessary clearance for three horizontal buses

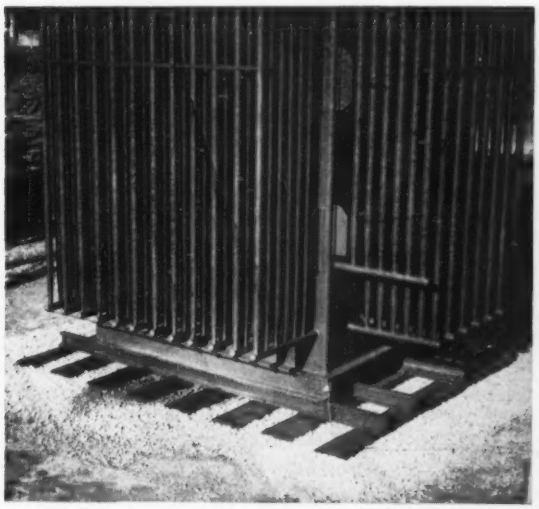
As secondary buses have identical elevations, length and size of secondary leads for each transformer size and voltage are standardized. Transformers are purchased with proper clamp-type lugs on low-voltage bushings. Leads are permanently installed so that there is no waste in cutting cable or installing longer leads. As the construction foreman knows that cable will fit, the elimination of guesswork saves time.

Splice Couplings Obviated

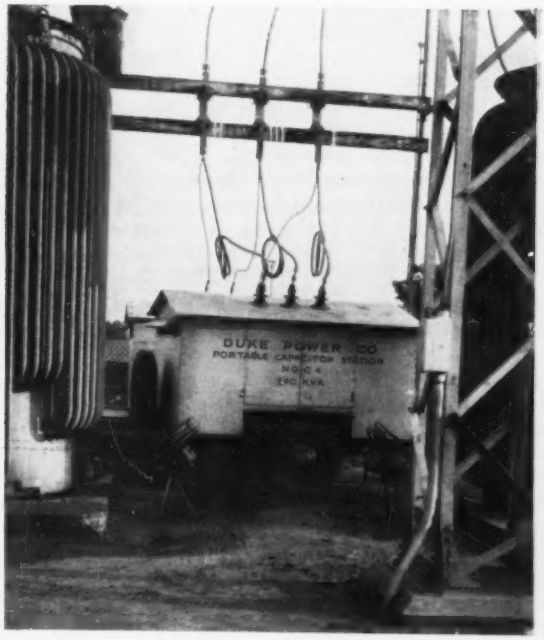
Secondary buses up to and including 2,000-amp capacity are one or two copper bars per phase with short spans and small insulators. Specifications for 3,000, 4,000, 5,000, and 6,000-amp bus call for 3, 4, 5, and 6-in. square ventilated copper-tube ¼-in. thick. Such bus has large capacity per lb, and its flat surfaces for bolting cable clamps make it very economical to install.

Square-tube buses are bought in 25-ft lengths to fit the low-voltage bus structure. This dispenses with splice couplings and permits complete salvage. The 3 and 4-in. buses are supported at ends and middle; the 5 and 6-in. buses have end supports only, thus saving insulators and bus supports.

The largest substation is for tapping 100-kv lines, a practice employed when no other adequate power source is available. Its structure consists of latticed columns with interconnecting struts made by bolting together angles,



FOUNDATIONS are creosoted crossties imbedded in crushed stone. Rails or H-beams support the heavier equipment



MOBILE CAPACITOR UNIT and portable fans are used to restore service when a single-phase transformer has failed

channels, and plates to form a series of bays. The 2-ft square columns are on 22-ft centers, this spacing permitting three horizontal buses between columns to have a 6-ft phase spacing and 4-ft clearance to column.

Engineering Time Halved

All 100-kv substations are made up from a standard list of columns, struts, and girders. This not only halves engineering time but eliminates loss in steel resulting from additions or revisions to or removal of the structure. Absence of strain buses cuts the cost by 25%. The basic strut is two 6-in. channels back to back with a ¾-in. gap between for bolt space. Insulators or other equipment can be bolted anywhere along the strut, holes in the steel not being needed.

The high-voltage bus is two galvanized steel angles, each 2½ x 2½ x ⅜ in., spaced ½ in. apart in the form of an inverted "T." This steel, with ½-in. spacer washers and splice plates, is purchased as part of the structure. Span lengths of 22 ft have no objectionable deflection.

Center-span taps, installed safely by one man on a hook ladder, are made with a flat-tongue bronze clamp-type lug for cable or pipe. The tongue occupies the gap between angles. In making taps, workmen observe only one precaution—they must see that conducting surfaces of steel bus and bronze lug are normally clean. Duke Power's 35 years' experience indicates that no electrolytic action occurs and that maintenance is the same as for other bolted electrical connections.

The normal 500-amp rating of this steel bus can be doubled by running a 4 x ¼-in. flat copper bar between the steel angles. Where structure and wiring plans permit, the bus is underhung on suspension insulators. This practice cuts costs as the cost ratio for 110-kv insulators is about 4-to-1 in favor of suspension.

Column foundations are standard-size, square, concrete bases with anchor bolts. Considerable economy has been obtained by substituting for wood forms a standard form of thin steel plates with angles welded outside for stiffness. Plates are bolted together at the corners to form the aboveground part of the base. Extensions are used when the base projects more than the depth of one plate above ground. Tops of the assembled forms leave a 3x3-in. bevel to the concrete base and have holes for setting anchor bolts.

Oil circuit-breaker foundations, similar to the crushed stone and crosstie foundations, have proved satisfactory. But H-beams replace railroad rails for 115-kv breakers. The beams are bolted to breaker tanks when they have not been installed by the manufacturer.

Normally, the point of delivering power to industrial customers is a set of disconnecting switches on a pole or structure just outside the substation plot. The switches are installed by the customers for their own use. The fire pump circuit is the only service on the company's side of switches.

Most substations serving industrial customers with delta voltage have three single-phase transformers instead of one 3-phase unit. The higher first cost is justified because outage time is greatly reduced during transformer failure by cutting out the bad unit and restoring open-delta service and the investment in emergency standby equipment is much smaller.

Emergency Units Mobile

Should the bank load approach the safe thermal limit, load is reduced until emergency equipment can be installed. Such equipment may be another transformer or a mobile capacitor unit and transformer cooling fans. Installation of emergency transformer capacity not only takes time and effort but places a financial burden on the company in maintaining emergency transformers of many sizes, impedances, and primary voltages.

The alternate method of restoring full service with an open-delta bank involves mobile units with capacitors arranged in two unequal groups. This reduces kva load on the two open-delta transformers, improves regulation, and balances voltage and current within operating limits. Transformer cooling fans keep copper and top-oil temperatures within safe limits.

Mobile capacitor units, transformer cooling fans, and emergency transformers are placed strategically on the power system to restore service in the least time. A few 3-phase transformers are mounted on trailers for use when two or all transformers fail. Two or more mobile units may be operated in parallel.

To back up substation delta-wye banks, a spare transformer is installed, or a transformer on a highway trailer is brought to the immediate vicinity. One mobile transformer can back up several delta-wye substations.

Substations served from lines 13.8 kv and above generally have an air-break switch on the primary side. Outdoor-type, high-voltage current transformers are mounted on the bases of 13.8 through 46-kv air-break switches. CT secondaries are connected to inverse time-delay over-current relays, usually with instantaneous attachments. The relays energize the operating mechanism of the switch during overload or fault on the bank.

Switches are either spring operated for automatic opening only or motor operated for reclosing as well. The motor mechanism consists of a ⅓-hp, 32-v, dc totally enclosed gear-head motor, a limit switch, and two crank arms with connecting links. Auxiliary relays usually are on the panel with the overload relays, mounted in a weatherproof metal box on a column supporting the air-break switch girder. A 9-v dry cell powers releasing of the spring-operated mechanism. Five batteries in series actuate the motor-operated mechanism.

At 100-kv substations an air-break switch gives overload and fault protection, and current transformers, hung on girders at the top of the steel structure, are connected on the load side of switches. Storage batteries power the switches' motor-driven operating mechanisms.

Except at generating stations, conduit and duct ways are virtually eliminated. Neoprene-jacketed cable is buried directly in the ground, conduit being used only from ground to switch mechanism housing or other control boxes.

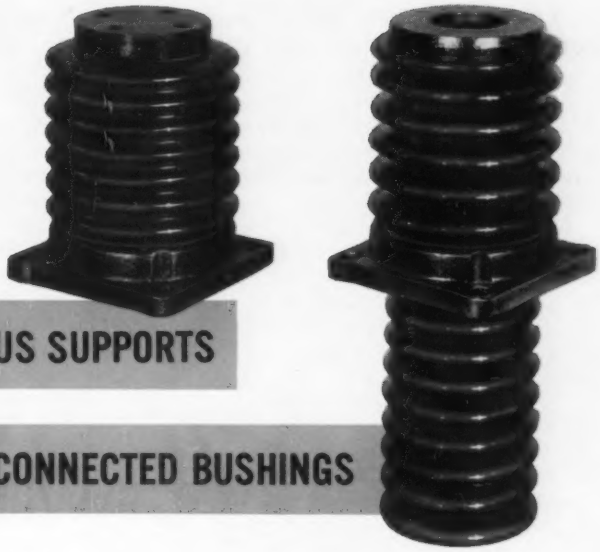
Rods Form Network

For grounding small and medium-sized substations, ¾-in. x 8-ft galvanized steel rods are driven at 10-ft intervals on a perimeter 2 ft outside the structure. Rod tops are 18 in. below the finished ground level and looped together with 2/0 copper wire. Taps to this loop, using non-ferrous clamps, are extended to the four corners of the substation structure and each piece of apparatus. Overhead ground wires are tied to the structure and to driven ground rods at the base of the first five poles away from the substation. Grounding at 110-kv substations follows this pattern, except that ground rods are driven also in the bottom of each column foundation hole and midway between each column. Rods are tied together in a network under the substation.

No question

of responsibility

with



Lapp INDOOR SWITCH AND BUS SUPPORTS

Lapp BACK-CONNECTED BUSHINGS

RATING, Kv		2.5	5	7.5	15L	15H	23	34.5
1.5 x 40 withstand, Kv		45	60	75	95	110	150	200
60 ~ withstand, Kv		15	19	26	36	50	60	80
CLASS A	A-10	X	X	X				
	A-20		X	X	X	X		
	A-30		X	X	X	X	X	
CLASS B	B-20		X	X	X	X		
	B-30			X	X	X	X	X
	B-40			X	X	X	X	X
	B-50			X	X	X	X	X
CLASS D	D-20			X	X	X		
	D-30			X	X	X	X	X
	D-40			X	X	X	X	X
	D-50			X	X	X	X	X

Throughout the range of NEMA standards (SG6-6.06) . . . in three design types, in five strength groups, and in voltage ratings 2500 to 34,500 . . . Lapp Indoor Bus Supports and Lapp Back-Connected Switch Bushings are *matching* series. They match in heights, diameters, strengths, and electrical characteristics.

But, in specifying Lapp bus supports and back-connected bushings, you gain more than the convenience and economy of interchangeability. Yours also is the assurance of single responsibility for performance of porcelain, metal parts and complete insulator assembly. And Lapp responsibility always means an extra margin of operating security, low upkeep and long life.

Available as standard or on specification from all leading switch manufacturers.

◀ Lapp Indoor Switch and Bus Supports and Lapp Back-connected Bushings are available as catalog items in matching voltage ratings, strength groups and design classes as indicated at left.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

Utilities Eye Fly Ash Market

Utility and manufacturing representatives to converge on Pittsburgh to study ways of converting a waste into a potential $200-million profit

If the fly ash were specified for $33-billion road-building program, government could save about $500 million

Fly ash markets will be the subject of a special meeting July 31 in Pittsburgh to be attended by representatives of electric utilities and manufacturers.

Called by Electrical World at the suggestion of a group of utility executives, the meeting will be aimed at showing how utilities can cash in on the nation's $33-billion road-building program by selling the ash waste from steam plants.

It has been estimated that the use of fly ash as a paving ingredient could save the federal government $500 million, perhaps more. If fly ash were specified, utilities could reap a "profit" of about $200 million.

Urgency of an immediate meeting is underscored by the fact that the road-building program already is under way. If power companies are to profit, they must act quickly to get fly ash specified, and they must prepare to supply the waste on a national scale, EW's Editor and Publisher Fischer Black points out.

Sintered Fly Ash Potentials Cited

The potentials of fly ash and sintered fly ash clearly indicate uses in all types of construction, he added. Duquesne Light Company has a road made only of fly ash and blast furnace slag. It is used 50 times a day by trucks carrying 16 tons of fly ash to a dump. In two years heavy rains have gouged away rock and clay on both sides of this 10%-graded road. But it has withstood punishing traffic and weather—proving that a superior road can be built with fly ash.

Great interest already has been expressed in sintered fly ash. A market exists here that, if cultivated, could enable utilities to sell all the fly ash their plants can produce.

Several manufacturers already have done research and developmental work in this field to solve problems related to the conversion of fly ash into lightweight aggregate. Now they need to know into what shapes utilities and other potential customers want the fly ash sintered. Black expressed hope that answers to that question would be revealed at the conference.

Delegates to the meeting will hear Henry H. Russell, project engineer, Bituminous Coal Research, Inc., talk on "The Market for Fly Ash." H. A. Price, U. S. Bureau of Reclamation, will discuss "Fly Ash in Heavy Construction." Building Better Roads" will be described by an expert in the field.

J. Homsher, manager of purchasing, Gilbert Associates, will discuss "Where Do Utilities Now Stand on Selling Fly Ash?" R. C. Wenz, general purchasing agent of Duquesne Light Co, will describe "Getting Fly Ash Sales Started." A group from Detroit Edison Co, including Floyd S. Nixson and C. M. Weinheimer, will discuss "Making a Success of Selling Fly Ash."

Representatives of Allis-Chalmers Manufacturing Co, Dravo Corp, Heyl & Patterson, Inc., Koppers Co, Inc., and McDowell Co, Inc., will talk about sintering fly ash.

As Electrical World went to press, arrangements were being made to enable delegates to the meeting to inspect several fly ash "test" roads and laboratory facilities of some of the manufacturers preparing to build fly ash sintering equipment. The tour also will include a cement block plant which uses fly ash in its products.

AGE Will Not Sell Common

Pres Philip Sporn tells New York Security Analysts that no common stock will be sold between 1956 and 1960

No new common stock financing is planned for the American Gas & Electric Co for the five year period, 1956-60, Philip H. Sporn, president, told members of the New York Society of Security Analysts.

He said the $700-million construction program of the system for the five-year period is expected to be financed as follows:

Sources	Millions
Internal	$253.7
Provision for deferred federal income	101.6
Subsidiari	
First mortgage bonds	276.0
Preferred stock	47.5
Bank Loans	21.2
Total	$700.0

Electric Heating to Pick Up

The system now has 5,000 homes being heated electrically, he said. In 1956 it expects to add 3,000 such customers.

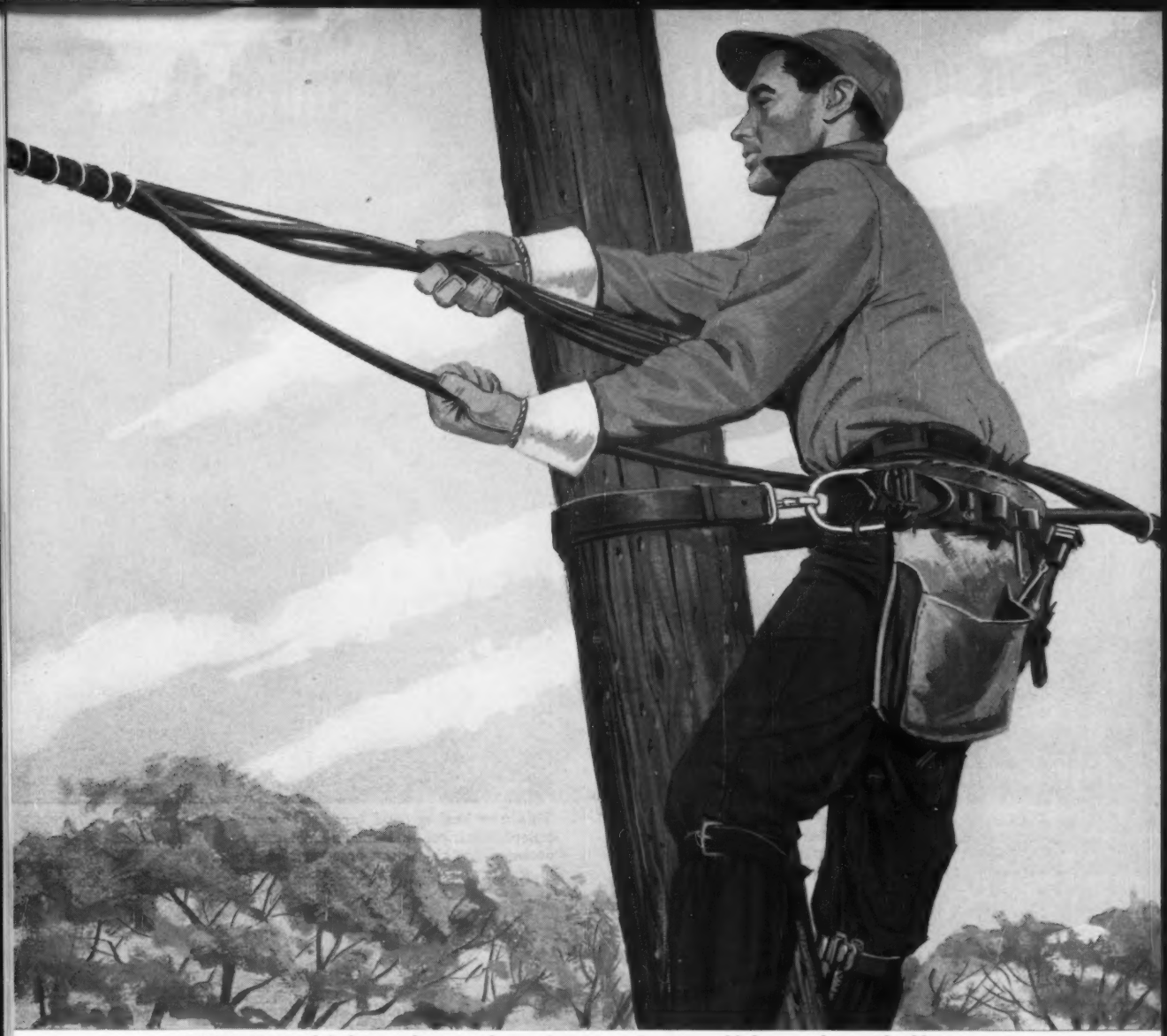
By 1966 around 30,000 electrically heated houses should be coming on the lines a year. By 1975, Sporn estimated that the AGE system will have close to 2 million customers, of whom almost 25% will be electric heating customers.

Total assets of the system will amount to $4 billion by 1975 as against a little over $1 billion at the end of 1955. Operating revenues should hit pretty close to $1.1 billion in 1975 as compared with $257 million in 1955, he added.

Sporn said that the system's rate of return was 6.06% in 1955. This compared with an average for eight companies of 5.64%. He further said that the recently acquired aluminum load was set up "on a rate structure to achieve a return of 6%."

Sees 2 Trillion Kwhr by '75

Speaking on the entire electric industry, he predicted that it will be producing two trillion kwhr annually by 1975 of which 7½% will come from nuclear energy. By 1975, he said, coal will account for 65% of the two trillion kwhr; water power, 12½%; gas, 10%; atomic energy, 7½%; and oil, 5%.



DEMONSTRATION of slack in conductors is shown when Anaconda preassembled reverse-lay aerial cable is untwisted. Opened cables enable linemen to make connections easily—without cutting conductors or messenger.

Built-in slack helps linemen make quick taps —with Anaconda reverse-lay aerial cable

When transformers, cutouts or laterals make numerous connections necessary — Anaconda reverse-lay aerial cable permits easy separation of conductors whenever the need arises.

Lay of the conductors is reversed approximately every five feet — within easy reach of linemen. Unwound between reversal points, conductors have sufficient slack to eliminate the need for cutting conductor or messenger when making connections.

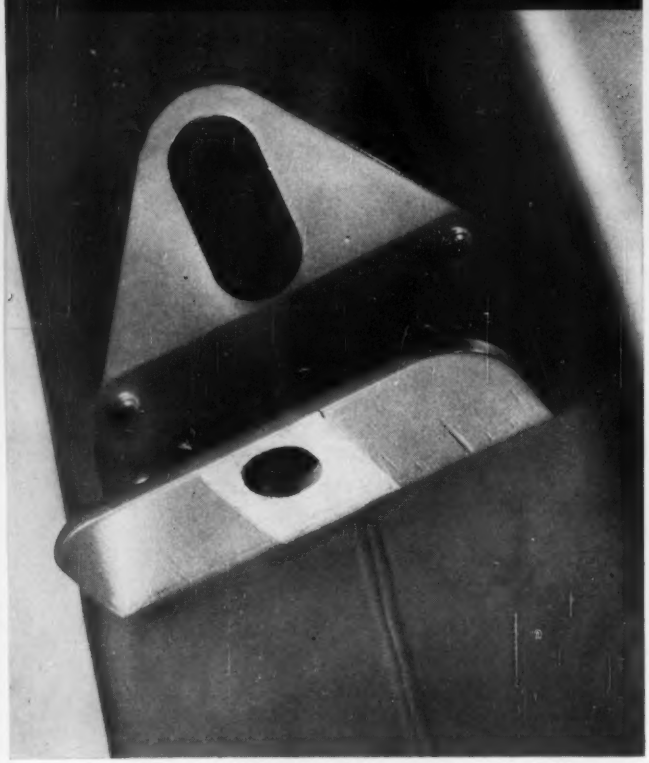
"Hot" taps can be made on 5kv nonshielded cables, eliminating power shutdowns. Opened cable allows use of wire guards and rubber blankets between the conductors for greater safety.

Ask the Man from Anaconda for full details. And write for new Aerial Cable Catalog. Anaconda Wire & Cable Company, 25 Broadway, N. Y. 4, N. Y. 56288

SEE THE MAN FROM ANACONDA®

FOR AERIAL CABLE

1 POSITIVE GROUND

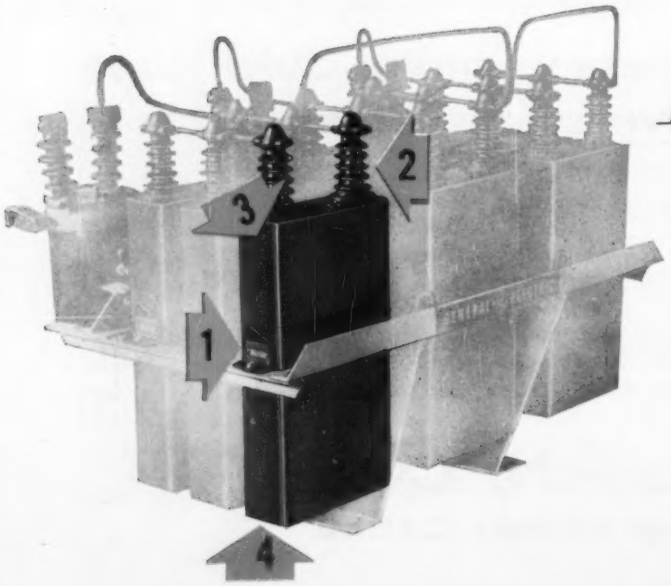


Permanent grounding is assured through an unpainted area on the bottom of the mounting bracket. Each capacitor bracket is welded to the case at eight points to provide maximum strength for hoisting and mounting.

2 PERMANENT CONNECTION

This new bushing and terminal assembly combines excellent electrical and mechanical characteristics. It accommodates aluminum or copper conductors in a 1000-lb. grip that compensates for cold flow.

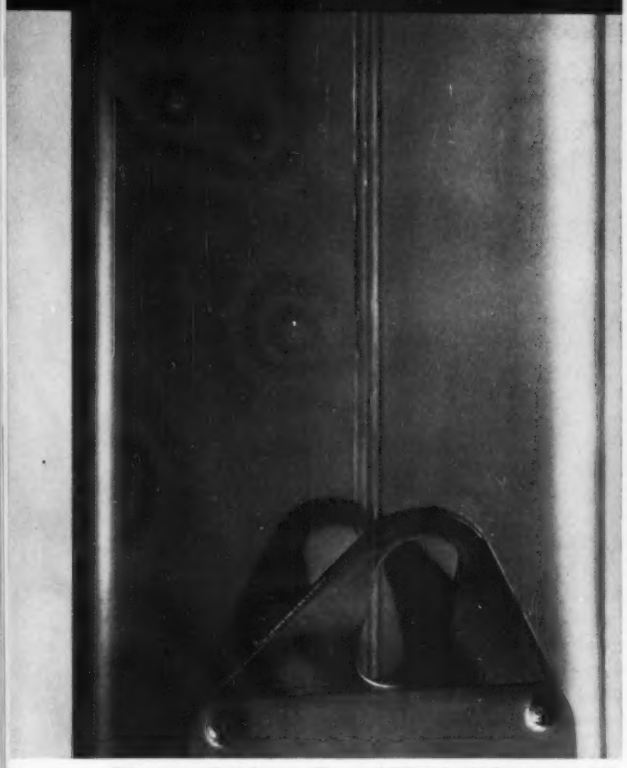
Four capacitor features



Engineered Extras

● of General Electric's 50-kvar capacitor make this unit and the equipments in which it is used the most efficient and economical source of kilovars available today—further evidence of General Electric's efforts to give you the most for your capacitor investment.

3 PRECISION WELD



The case of each new General Electric 50-kvar capacitor is automatically welded to provide a seam of controlled quality and uniform strength. In fact, this precision welded, hermetic seal is as strong as the case itself.

4 RECESSED BOTTOM

Recessed bottoms reduce scraping of the protective coating during warehousing and installation. This construction also prevents rain drops from collecting on the bottom of the capacitor and corroding the case.

that make a difference

The new General Electric 50-kvar capacitor—first of its rating in the industry—gives you these important Engineered Extras along with:

Less Weight Per kvar. One 50-kvar capacitor weighs 15% less than two 25-kvar capacitors. In switched equipments this provides an even greater weight saving—up to 25%.

Lower Cost Per kvar. One 50-kvar capacitor costs 10% less than two 25-kvar units. In switched equipments costs can be reduced even more—up to 25%—since a 600-kvar equipment needs no more switches than a 300-kvar equipment.

Because of General Electric's intensive capacitor research, capacitors have been continuously reduced in price. Today, the 50-kvar capacitor costs only $3.82 per kvar, or 55% less per kvar than capacitors of 20 years ago. For complete information about them, contact your G-E Apparatus Sales Representative. General Electric Company, Schenectady 5, N. Y.

441-36

Progress Is Our Most Important Product

GENERAL ELECTRIC

SEC Misconstrues Holding Co Act

In Louisiana P&L gas case, U. S. Court of Appeals decides in favor of Louisiana Public Service Commission

Court rules that the SEC had misconstrued a section of the Act dealing with "the loss of substantial economies"

A U. S. Court of Appeals has ruled that Securities and Exchange Commission has been misconstruing a section of the Public Utility Holding Company Act of 1935.

In a decision handed down on June 30, the Fifth Circuit Court of Appeals ruled in favor of the Louisiana Public Service Commission. The court ordered SEC to reopen the record of proceedings that resulted in the SEC order which, among other things, directed Middle South Utilities, Inc, and Louisiana Power & Light Co to divest themselves of the Louisiana company's gas and water properties.

SEC issued this order to Middle South and Louisiana P&L on March 20, 1953. When no petition was filed for review of the order, SEC ultimately set March 20, 1955 as the deadline for LP&L to get out of the gas and water business.

In an attempt to comply with the SEC order, LP&L submitted a program to SEC in November 1954. The utility proposed to transfer its gas and water properties to a new wholly owned company, Louisiana Gas Service Corp.

PSC Sides with Utility

Subsequently Louisiana PSC, urging that the company be permitted to retain its gas business, requested SEC to reopen the basic question of whether the gas properties should be divested.

After a public hearing SEC denied the Louisiana Commission's application. So the PSC appealed to the Court of Appeals in New Orleans. Louisiana P&L intervened in the case taking the position that it should not be required to dispose of its gas properties. The court decided in favor of the PSC, and now the whole case is right back where it started.

In an intervention filed in the case, Middle South objected strenuously to any action that would authorize SEC to reopen its order as relating to the Middle South system as a whole.

The Court of Appeals upheld Middle South by declaring that SEC would have to restrict any further consideration to the relations between Middle South, Louisiana P&L, and the gas system.

The court case centered around SEC's interpretation of a part of the Public Utility Holding Company Act regarding "the loss of substantial economies." This is in Section 11 of the Act, 15 USCA, Par 79k(b)(1).

This section provides that SEC shall "permit a registered holding company to continue to control one or more additional integrated public-utility systems, if, after notice and opportunity for hearing, it finds that—

"A. Each of such additional systems cannot be operated as an independent system without the loss of substantial economies which can be secured by the retention of control by such holding company of such system."

The court said that SEC had misconstrued this part of the Act in holding that the proposed gas company was the "only company whose loss of substantial economies was to be considered." The loss of substantial economies to the parent Louisiana P&L should be considered, the court said.

The Louisiana PSC offered the court detailed computations of anticipated losses to both companies. The PSC placed these losses at $684,377 for Louisiana P&L and $272,816 for the proposed gas utility.

SEC answered that it has consistently interpreted this section of the Act as applying only to the proposed company and not to the parent company.

The court pointed out that: "We do not make any findings here contrary to those arrived at by the Securities and Exchange Commission. We do decide that in making its findings on the crucial question of loss of substantial economies the Securities and Exchange Commission refused to give weight to important facts which, if as alleged by petitioner (PSC), would have presented an entirely different picture."

"Substantial economies," said the court, means important economies. "The question of their importance must, of course, be determined by the bearing they have on the ability of the two systems to continue in the serving of the two commodities in general demand without substantial change in policy, serving practically in the same way, making substantially the same gains, suffering substantially the same losses."

SEC now has the choice of appealing to the U. S. Supreme Court or reopening hearings on its decision that Middle South and Louisiana P&L must divest themselves of the Louisiana company's gas properties.

NEWS IN BRIEF

ATOMIC

Consolidated Edison Co officials estimate that cost of power to be developed in 1960 at its Indian Point nuclear station will run "only slightly above" that of the most efficient conventional fuel-burning units . . . **A group of West German** electric power companies, Bayernwerk AG., plans a jointly owned pressure-water reactor for training purposes. Reactor won't be built until U. S. puts its first five reactor types in service and operating experience shows which is best.

Mexico's President Adolfo Ruiz Cortines has appointed a three-member Nuclear Energy Commission, the first positive step in Mexico's program of atomic development . . . **North Ireland's government** is to spend $184 million on an atomic power station to meet increased power demands seen for 1968 . . . Atomic Energy Commission has approved two grants of $350,000 each toward the cost of a nuclear research reactor project in the **Netherlands** and in **Denmark.**

PROPERTY TRANSFERS

Washington Water Power Company is negotiating to purchase the Lighthouse distribution system, operated by Bunker Hill Mining Co, Idaho. Within

(*Continued on page* 43)

Cut down these "overhead" costs!

Use pole line hardware that lasts as long as the pole . . . . . made of USS COR-TEN STEEL

Your maintenance budget gets welcome relief when pole line hardware is made of USS COR-TEN Steel.

Because COR-TEN Steel has 4 to 6 times the resistance to atmospheric corrosion of ordinary carbon steel, it takes rust *much* longer to penetrate to a damaging degree. And, since COR-TEN Steel is so much stronger —it has a 50% higher yield point than carbon steel—hardware made with COR-TEN Steel can wear far thinner and still do its job efficiently, without need for replacement.

These two important factors mean that your pole line hardware can confidently be expected to *last the life of a creosoted pole* when it is made of USS COR-TEN Steel.

For a copy of our free booklet, "USS COR-TEN STEEL pole line hardware," and for a list of firms manufacturing pole line hardware from USS COR-TEN Steel, write to United States Steel Corporation, Room 5404, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

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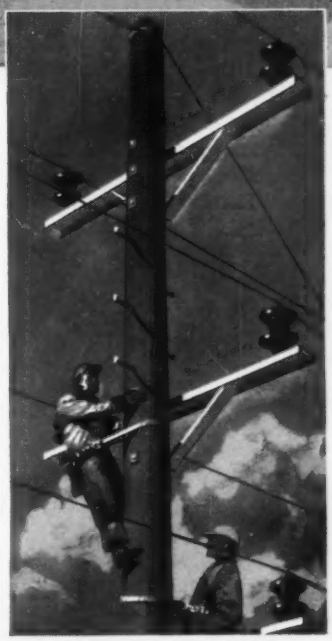
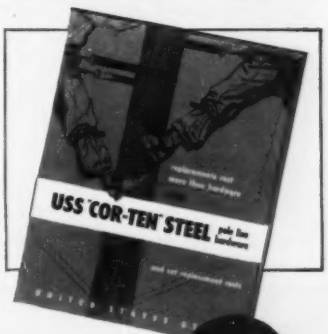




USS COR-TEN High Strength STEEL

6-202

UNITED STATES STEEL

Connecticut L&P Engineers Go to School

Some 20 engineers at the Connecticut Light & Power Co have been attending a 14-week "night school" recently at the utility's headquarters building to study the fundamentals of nuclear and reactor physics.

The idea of the course originated with CL&P's Vice President Calvin T. Hughes, left, pictured with the Yale University professors who are teaching the course, Dr Ernest C. Pollard, chairman of the Biophysics Department; Dr William J. Knox, and Dr Arthur R. Quinton of the Physics Department.

Hughes and other company officials feel that such a course will provide a foundation in atomic science and help prepare for the day when CL&P becomes actively involved in the atoms-for-power field.

3-Way Communication Urged

Communication is "an effort to reach the minds and hearts of others—to inform them, establish a link with them, motivate and inspire them." This statement was made by Elmer L. Lindseth, president, Cleveland Electric Illuminating Co before the Silver Bay Conference on human relations in industry at Silver Bay, New York, recently.

He urged a three-way communication. Not just from the top management on down or from the bottom up, but also a horizontal interchange through each echelon is necessary for proper coordination and integration of efforts in an organization.

Lindseth then stressed the necessity for using the most expeditious channel of communication. The formal pattern of communication, he said, flowing through channels of authority, is somewhat the "old Army way." An easier way is a more informal method where information flows through channels of contact—when a man needs information he gets it directly from the one who has it.

Some people, he declared, are of the opinion that communication outside the formal channel of authority leads to a loss of control. This, however, is a viewpoint of the typical poor communicator and the insecure, he pointed out.

Three way communication and more direct flow of information are ways to avoid getting bogged down in long-line channels.

He noted the requirement of learning to use established, successful techniques, whether it be staff meetings, newsletters, pamphlets, supervisor's meetings, etc, to provide regular and routine mechanisms for expediting flow of communication. Whether communications are written or oral, he said, regular scheduling is of great value.

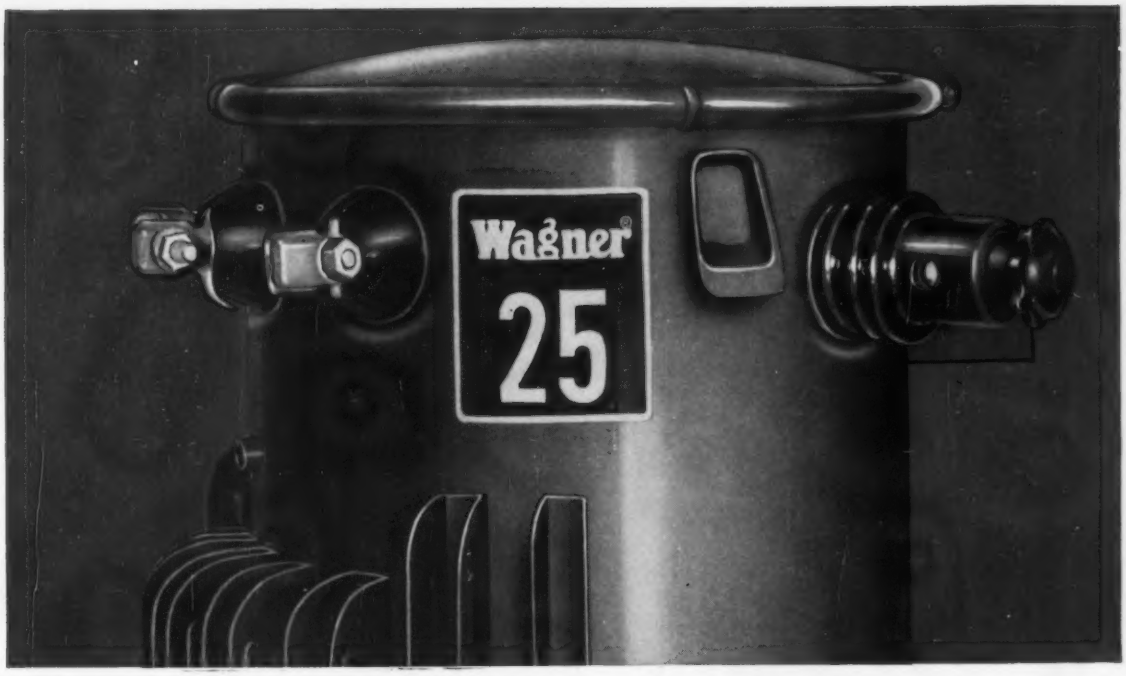
LABOR BRIEFS

Industrial Relations Committee of the Edison Electric Institute has just released the program for its Ninth Annual Round Table Conference to be held in Chicago on Sept. 17-19. The theme for the conference is "Preparing Today for Tomorrow's Problems." For reservations, write Edward S. Evans, secretary, 420 Lexington Ave, New York 17.

Five students enrolled in courses leading to bachelor of science degrees in any technological field and four colleges (Stevens Institute of Technology, Seton Hall University, Rutgers University, and Princeton University) will benefit from Jersey Central Power & Light Co's college scholarship program put into effect for the school term 1956-57, Charles E. Kohlhepp, president of the utility announced recently.

Wisconsin Public Service Corp has awarded 12 scholarships, following essays contests, valued at $240 each to farm courses at the University of Wisconsin and the Michigan State University. Scholarships will apply to the 1956-57 sessions and are of 15 weeks duration.

Safety awards for an accident free year during 1955 have been presented to 20 separate divisions of the Black Hills Power & Light Co, Rapid City, South Dakota. The awards, from the North Central Electric Association, were presented by Mearl Weedman, BHP&L safety engineer. Top honors went to ten (Belle Fourche, Custer, Edgemont, Lead, Sturgis, Spearfish, Provo Plant, Pluma Plant, Rapid City Plant, and Redwater Plant) of the 20 divisions for completing five consecutive years without a lost time accident since the program's inception in 1951.



Wagner Form W Transformers

offer smaller size—lighter weight—sealed tank construction—key-locked safety bushings

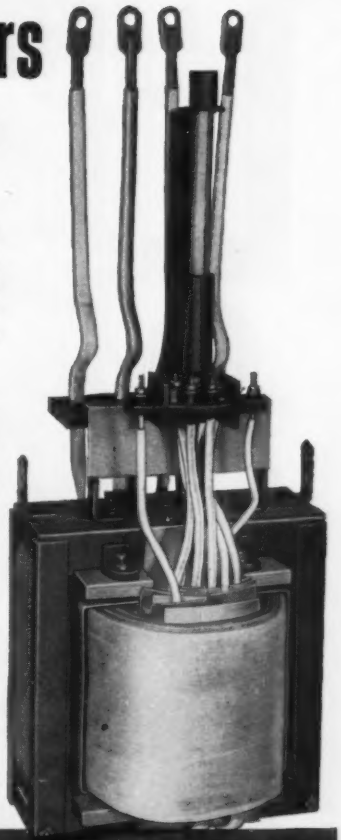
Wagner Form W Distribution Transformers, with wound cores and improved insulation, are now considerably smaller in size—lighter in weight than ever before. Yet they are liberally designed for excellent electrical performance—low core and copper losses—good regulation—high overload capacity for peak loads. Sixty-five years of transformer manufacturing experience are your assurance of Wagner dependability. Specify Wagner for your lines—get these proven features:

Only Wagner offers the Shur-seal cover design that keeps the transformer as air-tight as a welded tank, yet lets you remove the cover by loosening a single bolt.

Low voltage bushing and terminal are key-locked to prevent turning when tightening. Reduces danger of internal shorts. Takes copper or aluminum conductor.

High voltage sidewall bushing is safety-designed for insulated knob connection. Takes either copper or aluminum conductor. Porcelain and terminal are locked in position.

New Form W Element with cold-rolled wound core. Thermosetting insulation bonds coil element into a solid unit, braced to prevent shifting inside tank.



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On-the-Spot Service is Key to Savings with Allis-Chalmers Regulators

LIVE BETTER ELECTRICALLY

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these savings

All it takes is a 2-man crew and a pickup truck to handle 99% of the service requirements of Allis-Chalmers regulators. The reason — UNIT CONSTRUCTION.

"Unit Construction" eliminates piecemeal inspection — a long time-consuming process.

With Allis-Chalmers regulators, a 2-man crew arrives in a pickup truck, sets up the hydraulic jack and, in a matter of a few minutes, has lifted the regulator far enough out of the tank for inspection. There's no need for large crews and expensive equipment to move and untank the regulator.

Estimated hourly cost of crews is about $9 for a 2-man crew and about $18 for a 4-man crew. A saving of at least $9/hour. The picture at left tells at a glance the story of easy maintenance with Allis-Chalmers unit construction.

This is only one point of comparison. For the complete story, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

CHALMERS

A-C ALLIS-CHALMERS

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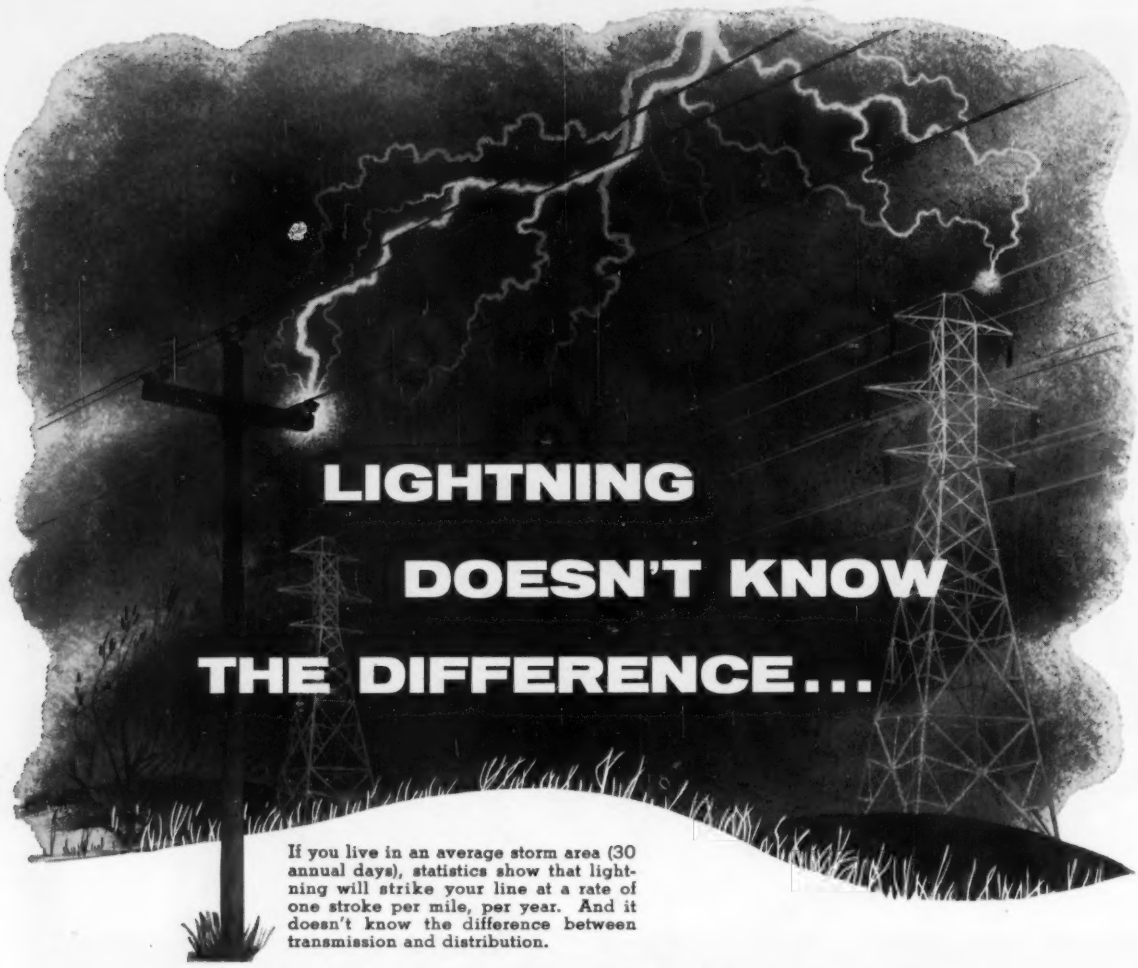


If you live in an average storm area (30 annual days), statistics show that lightning will strike your line at a rate of one stroke per mile, per year. And it doesn't know the difference between transmission and distribution.

Has High Cost Kept Arrester Protection Off Your Primary Distribution?
Then Investigate The Thorex

To lightning, all lines look alike. But some are better protected than others. High voltage transmission has good shielding, efficient grounding, and the best arresters at stations. Primary distribution, in the range of 22 kv and below, seldom enjoys such privileges, however. Yet these are the pipelines to your customers.

Once, it was not economic to equip such lines with arrester protection--it was either too costly or ineffective. Today it's different. Today, a lightning arrester at "rock-bottom" price, the Thorex GP, passes every standard requirement for first class station application, and is materially better than any arrester on the market just a few years ago.

Now, you *can* install arresters on the lines that actually deliver your power. See how inexpensive it is with the Thorex--inexpensive, but the best you can get!

Ohio Brass

MANSFIELD **OHIO, U.S.A.**

4635-H

Outline of Appalachian Electric Power's Training Program

1. Approximately ten questions on operational functions in the station or territory involved are handed to attendees at the beginning of each meeting for written answers during the session. They retain the questions for later preparation of studied answers after reference to the Operating Manual, Operating Orders, and various diagrams.

2. One or more switching demonstrations are made frequently. Placards or blackboards illustrate control wiring, certain relay connections, interlock circuits, unusual switching setups, and fire-fighting equipment.

3. Employees' operating problems are discussed.

4. Questions of a practical nature are raised on station circuits, switching, equipment, relays, controls, and automatic features. Most of the questions are based on the company's two operating instruction books, the Operating Manual and Operating Orders File, and these instructions are touched on at most sessions.

5. At all "cut-ins" of new jobs and major maintenance outages, the system operating supervisor demonstrates correct switching procedure. On new jobs, particularly, all switchmen who are normally used and their alternates go through the various switching cycles so they will be prepared for emergencies. Based on written instructions regarding automatic features and the manual of procedures for each station, questions are prepared for use from time to time.

6. In the case of new stations or new equipment at unattended sites, employees and alternates assigned to handle the switching in emergencies are put through the complete switching sequence before or at the time the station goes in service. Usually more than one demonstration of the complete switching cycle is made.

7. General duties and knowledge expected of station operators and switchmen have been outlined. Questions based on this explanatory material stimulate study by employees.

8. Employees' records at various sessions and results of their examinations are kept in a confidential file which with merit progression examinations are helpful in promotional steps. Such records are never circulated and are primarily used to guide the instructor in stressing points not well understood.

Following the above 8-step basic program . . .

Utility Gives 'Perpetual' Training

Appalachian Electric Power program in ninth year helps keep system operation employees up to date on station equipment and procedures

H. E. McCORMACK, Superintendent, System Operations, Appalachian Electric Power Co, Roanoke, Va.

Appalachian Electric Power System's "perpetual" training program for system operation employees began its ninth year last month. Conducted on a 90-day cycle that permits instructor four visits a year to each station, the program has two main objectives:

- Up-dating of employees on station equipment and conditions to cover operating emergencies.
- Maximum safety in switching and other operating functions through employee familiarization with equipment operation.

The training is conducted for system operators, load dispatchers, plant and station operators, switchmen, and attendants. Principally, it embraces operating requirements for the main system and includes instructions on relay protection, automatic functions, and manual steps that these employees may have to take in emergencies or when automatic equipment fails to function so that equipment and service to customers may be restored promptly.

Employees are kept up-to-date on these conditions because the men may be used frequently during emergencies to operate different stations, most of which are fully automatic and largely unattended.

The Appalachian System includes Appalachian Electric Power Co, Kentucky Power Co, Kingsport Utilities, Inc, and Kanawha Valley Power Co. The system consists of seven steam plants with a capability of 1,341,000 kw and eleven hydro plants with a capability of 176,000 kw. There are 44 stations on the 330-kv, 154-kv, and 132-kv systems, and there are 3,580 miles of 22-kv line and above. The Appalachian System is interconnected with associated American Gas & Electric operating companies and five other utilities.

The training program has been well received by participants and management. It is regarded as being valuable

to both the company and employees.

During 1955, 27 stations were visited, 76 sessions were held, and 270 employees participated. Expenses for this period totaled $6,675—an average of $24.72 a person. This does not include call-out time pay for participants.

In view of equipment improvements and automation of stations, the employees' experience in switching and service steps would be delayed and inadequate without this program. The principal function is to see that these employees know the necessary steps for safety, restoration of service, and protection of equipment. The results show an improvement along these lines. With faster accurate switching the men gain training more quickly and thoroughly, and operating errors are held to a minimum.

An instructor from Appalachian's headquarters in Roanoke, Va., is being accompanied during 1956 by one of the system operators in the territory involved. This procedure, started successfully last year, acquaints the system operators with conditions and provides the instructor with help at the meetings.

At the beginning of each session, about ten questions on operational functions are given employees (see sample questions above). Their written answers are turned in, and the questions are retained for studied answers gained from reference books. The "homework" is either mailed to the instructor or collected by him on the next visit.

The training is based on Appalachian's Operating Manual, its file of Operating Orders, switching to handle hypothetical troubles that might occur, and general electrical knowledge that all operators and load dispatchers should have.

Since 1947, the program has evolved from instruction at six principal stations to training at all stations and generating plants, both steam and hydro. This includes main and subtransmission stations on the Appalachian System. Initially, it consisted of a backlog of notes on major cases of trouble, unusual switching procedures, and progressive improvements in procedures for handling emergencies.

These additions to the accompanying training program outline have proved desirable:

- Some stations warrant more frequent meetings under the local supervisor.
- Additional discussion on current and impending work is helpful.
- Instructors must have plant, station and general operating experience to be familiar with procedures.

Sample Questions Used in Training Program

1. Explain the conditions necessary for oil circuit breakers to reclose with the selector switch in each of these positions: manual, off, bus, line-bus, and line.

2. Where synchronizing facilities are provided, why is it necessary to have the synchronizing switch or bayonet in the "on" position to reclose the oil circuit breaker with the selector switch in the "manual" position?

3. Several of the 132-kv stations have an additional selector switch marked "hi speed" and "normal." What change is made in the reclosing circuit with the switch in each position?

4. Explain the difference in the "check synchronizing" and "synchronizing" reclosing relays.

5. Why is the control circuit of the red (close) indicating light connected in series with the oil circuit breaker trip coil?

6. Under what condition does an oil circuit breaker lock out?

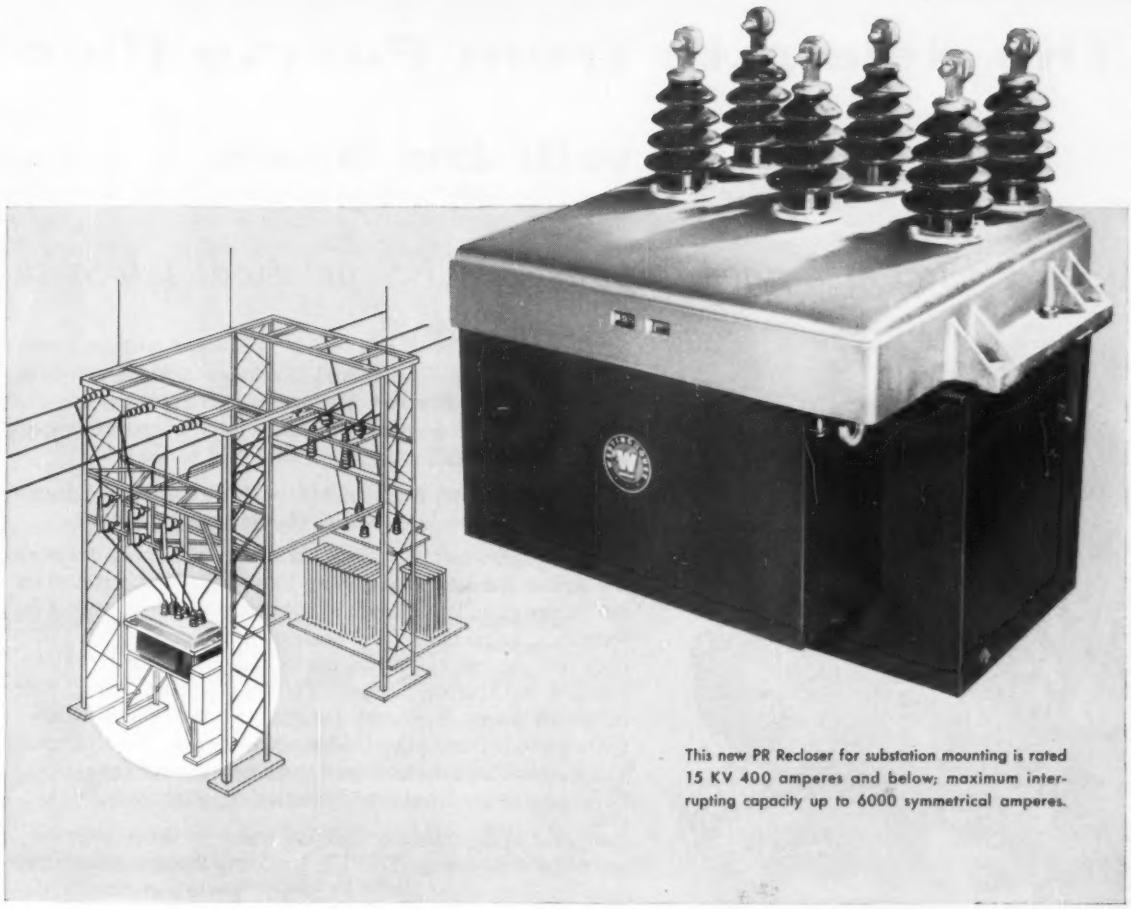
7. The color code used in designating air break and disconnect switches has two additional colors. Name the seven colors and the type of switch each color designates.

POWER BRIEFS

● Expansion and improvement plans for the Edmonton, Alta., area call for estimated expenditures of $7 million this year, Calgary Power Ltd reports. The company currently is pushing completion of its $8 million, 66-Mw steam station at Wabamun. It is scheduled to go into operation sometime in October.

● A second 137.5-Mw generator addition to Jersey Central Power & Light Co's Sayreville station will highlight a 3-yr, $63 million expansion program. Duplicating a generating unit installed in 1955, the new unit will be ready for operation late in 1958. This will make the utility's capacity four times bigger than it was ten years ago . . . Company also believes a $3.5 million transmission line now being built to join two power stations, plus several interconnections, (proposed), will stall off need for a power station at the Shore for another ten years or so.

● British Columbia Power Commission will pay a $3 million purchase price to Northern B.C. Power Co Ltd., for its electrical distribution systems at Prince Rupert and Stewart. NBCP Co is a subsidiary of Power Corp of Canada Ltd. It serves 4500 customers. Generating facilities include a 3,375 kw hydro plant at Falls River, 1,012-kw hydro plant at Shawatlans, and a 6,375-kw diesel-steam plant at Prince Rupert. A small hydro-diesel unit serves Stewart.



This new PR Recloser for substation mounting is rated 15 KV 400 amperes and below; maximum interrupting capacity up to 6000 symmetrical amperes.

NEW automatic recloser

. . . inexpensive protection for growing substation loads

Here's a packaged bargain for your distribution system in the substation or out on the line.

First of all, the new PR recloser provides 2-3 cycle, high-speed opening, and fast, efficient power restoration. This means, too, much greater protection than ever before against line burn-down. It's all completely automatic . . . real assurance of service continuity on your system.

Second, the package unit is especially built for reduced installation and operating costs . . . shipped frame mounted, wired, tested, ready to be put on the line.

Third, many circuit breaker features are built into the new PR recloser . . . proved condenser bushings, multi-ratio bushing current transformers for ground trip and load indicating metering and other relay functions, dependable motor reclosing, in addition to the time-proved Westinghouse De-ion® interrupters.

Fourth, to ease operating chores, the Westinghouse recloser design provides two separate tanks . . . one, an oil tank, housing the interrupters; the other, a relay and mechanism tank. No scrambling in oil tank with recloser control devices . . . a tank lifter offers easy oil and contact inspection. An accessory cabinet is available with ammeters, control protection and switches . . . demand meters separately trough mounted provide means of load indication and integration.

There's more to the story, so call your Westinghouse representative, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-60890

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

The delegate from Puerto Rico will be back

Westinghouse again sponsors CBS political telecasts

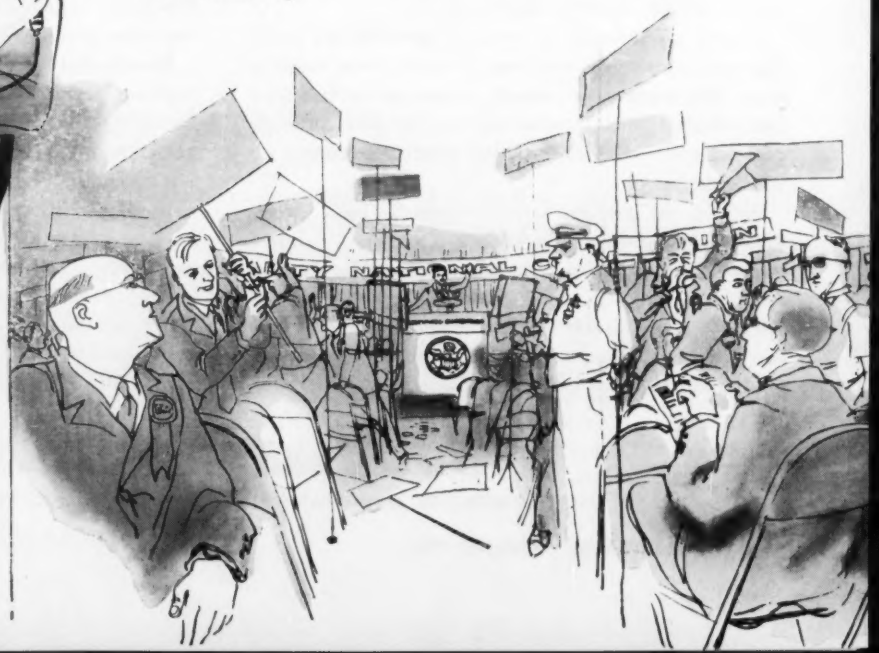
Remember the sincere . . . and hilarious . . . gentleman from Puerto Rico at the last convention? His impact on the nation's funny bone demonstrates the intense interest focused on this event. His last message was, "I'll be back."

Again this year, millions will be tuned in to the drama and excitement as both parties choose their candidates.

Social Significance: Thoughtful America will concentrate on the serious business that is Step One to the White House for our future president. The public knows that background information helps them form their own decisions. That's why they will listen to commentators like Walter Cronkite, Edward R. Murrow, Lowell Thomas, Robert Trout, Eric Sevareid, Larry LeSueur, Douglas Edwards and Charles Collingwood. During this thirteen-week period, Westinghouse will sponsor the television and radio coverage of the conventions, campaign debates and election-night returns.

Promotional Significance: Largest mass audience ever concentrated will watch 175 TV stations, listen to over 200 radio stations while Betty Furness, "world's greatest appliance saleswoman," Walter Brooke, Olin Tice and Stuart Metz add their voices to the "Live Better Electrically" and "Housepower" campaigns. This year, for the first time, Westinghouse messages will be broadened to include commercial and industrial electrification. To top it off, local electric utilities will participate in the preconvention broadcast over TV and radio stations carrying the program within their territory.

1. Larry LeSueur
2. Robert Trout
3. Charles Collingwood
4. Walter Cronkite
5. Lowell Thomas
6. Edward R. Murrow
7. Eric Sevareid
8. Douglas Edwards



Impact: The CBS convention telecast will be seen in every market, every industry, every community, practically every home in America. Total audience is estimated at 55,000,000 per day—81,000,000 *different* people each week.

Local Curtain-Raiser: Commercial time in the preconvention show is being made available for utilities to acquaint their community with the local electrical programs.

"Live Better Electrically": Results prove Betty Furness sells appliances. Every sale she makes must first make the basic sale of *electrical living*.

"Housepower": Many of the Westinghouse messages will refer to the utility industry's "Housepower" program . . . adding the force of television to the industry's greatest promotion of the year.

Commercial & Industrial Electrification: The expanded power of broadcast selling now makes it feasible to promote equipment for commercial and industrial electrification. Watch for it!

J-97195

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

1. Betty Furness
2. Olin Tice
3. Stuart Metz
4. Walter Brooke

Detroit Edison Ups George

Edwin O. George, manager of sales for Detroit Edison Co since 1952, has been elected a vice president of the utility. His appointment becomes effective Sept. 1.

George has been affiliated with Detroit Edison since 1929, when he joined the company as a clerk in the sales department. He was named supervisor of the commercial office division in 1943. Two years later he was promoted to assistant to the sales manager, and in 1948 he was named assistant commercial manager. He became commercial manager in 1951. George is presently chairman of Edison Electric Institute's Wiring Promotion Committee, which is sponsoring the industry-wide "Housepower" program (EW, July 16, p 23).

The new vice president is a 1928 graduate of Knox College, Galesburg, Ill., and earned his master's degree in public utility economics at the University of Illinois in 1929. He did further graduate work in business administration at Wayne University in 1938.

EDWIN O. GEORGE

Talley Named Calectric VP

The appointment of John A. Talley as vice president and comptroller of California Electric Power Co has been announced by Calectric's board of directors. Talley succeeds Howard Boylan, who retires after serving the company for 33 years.

Talley, who has been assistant comptroller of the utility since 1951, has been associated with Calectric for the past 32 years. He is also chairman of Calectric's labor relations committee and directed development of the company's expanded employees' pension plan and its disability insurance plan.

Boylan has been vice president and comptroller since 1943, and previously served as vice president.

JOHN A. TALLEY

Sloan Is Elected Executive VP

Robert J. Sloan has been named executive vice president of Crouse-Hinds Co to coordinate the activities of all departments. He remains company secretary and executive vice president of Crouse-Hinds Co of Canada, Ltd, Canadian subsidiary.

His promotion is part of a management realignment necessitated by last year's retirement of Board Chairman William L. Hinds, President Albert F. Hills, and Executive Vice President W. C. Blanding.

Others promoted are F. Ware Clary to senior vice president, public relations; Francis M. Truman, vice president, employee relations; Hamilton Armstrong, vice president-general superintendent; John G. Hummel, vice president, industrial engineering; C. Frederick Graham, vice president-managing director, and Raymond W. Cummings, controller.

ROBERT J. SLOAN

taps and splices

copper
ACSR
aluminum
steel and
copperweld

NOW...

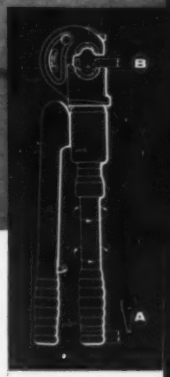
BURNDY PUTS 12 TONS IN YOUR HANDS

Y35 HYPRESS

all BURNDY compression connectors for overhead lines may be installed with the Y35 HYPRESS including

- CRIMPITS
- HYSPLICES
- DEADENDS
- ELTAPS
- LINKITS
- BYTAPS
- T-TAPS

SIMPLIFIED DIE INSERTION — Identical interchangeable head and ram dies easily inserted and locked in position so that HYPRESS can be moved along connector without movement of dies.



QUICK RAM ADVANCE — Clockwise rotation of handle (A) moves die up to grip connector (B). Installation is completed by pumping until built-in overload valve clicks open. Trigger returns die to pre-set position.

Burndy developed and produced the first portable hydraulic HYPRESS in 1938. Experience and field usage since that time has made these features possible:

- Lightweight — weighs only 12 pounds
- Head Rotatable 180°
- Neoprene Insulated Body and Handles
- Crimping Die Release Trigger on Handle
- Sealed Hydraulic System

For further details or demonstration, contact your Burndy representative or write Burndy, Norwalk, Connect. — Toronto, Ontario for instruction manual.

BURNDY

E5-6

It's good business to connect with Burndy ... FIRST name in electrical connectors; tools; methods

McGovern Elevated to VP Post

Newly elected executive vice president of United States Rubber Co is John W. McGovern. He will succeed H. Gordon Smith, who will retire Aug. 31 but who will continue as a member of the board of directors.

McGovern, also elected vice chairman of the executive committee, takes his new post Sept. 1. He joined U. S. Rubber in 1920 as an accountant and was placed in charge of factory accounting at the East Cambridge plant a year later. He subsequently served as supervisor of industrial engineering, control manager of various company divisions, and assistant general manager of operations, Tire Division. During World War II he became general manager of the newly formed Munitions Division, and in 1943 was named general manager, Tire Division. He was elected a vice president in 1945 and a director and executive committee member in 1951.

JOHN W. McGOVERN

PERSONAL BRIEFS

George Brunzell, manager of the Spokane Division of Washington Water Power Co, has been appointed assistant to **Pres Kinsey M. Robinson,** the first assistant Robinson has named. Brunzell will continue his work as division manager.

New production engineer for Carolina Power & Light Co is **James Arthur Jones,** who succeeds **R. S. Talton,** recently named superintendent of power. Jones will be in charge of all steam power production and of design and construction of new generating units.

Philadelphia Electric Co has named **Eugene J. Bradley** as assistant counsel . . . **Watson F. Tait, Jr,** has been elected a director of Public Service Electric & Gas Co to fill the unexpired term of **William H. Speer** who has resigned. Tait is vice president in charge of the company's electric operations.

Rudolph A. Schatzel, vice president and director of engineering for Rome Cable Corp, has been elected 1956-57 president of American Society for Testing Materials . . . **LeRoy W. Leibrand** has been elected president of the Mountain-Pacific States Conference of Public Service Commissions. He is a member of the New Mexico Corporation Commission.

In recent reorganization of the Westinghouse Electric Corp Major Appliance Division, **George H. Meilinger** was named manager of distribution and **W. B. Creech** became manager of major accounts. Manager of the newly created sales planning department is **J. R. Clemens** . . . Promotions resulting from realignment of the Portable Appliance Division include **J. E. Hugo's** appointment as manager of distribution and **C. G. Duy's** advancement to manager of sales planning . . . **B. M. Brown** has been named manager of the Baltimore, Md., divisions to replace **F. W. Godsey, Jr,** who has resigned. **Dr. S. W. Herwald** succeeds Brown as air arm plant manager, and **N. V. Petrou** is new engineering manager.

Jules A. Mack is new chief engineer of Hubbard & Co's Pole Line Hardware Division . . . Rome Cable Corp has appointed **Richard G. Poole** to the newly created position of assistant to the executive vice president.

S. Morgan Smith Co has designated **Carl J. Wilcox** head of its new Valve Division . . . **Herbert G. Dent** has been appointed by Joseph T. Ryerson & Son, Inc, as director of its re-named Plant Engineering Division, formerly the Industrial Engineering Division.

I-T-E Circuit Breaker Co has appointed **David F. Bowman** to head a new RF design department within its Special Products Division . . . **A H. Jackson** is new vice president-general manager of Blaw-Knox Co's Equipment division plant. He replaces **Capt. E. C. Rook,** recently named vice president-general manager of the fabricated products group . . . Philco Corp has advanced **Harold W. Schaefer** from vice president in charge of engineering to vice president of the Appliance Division.

Harold M. Jalonack, manager of marketing research and product planning for General Electric Co's distribution transformer department, will retire August 1 after 39 years with the company. Jalonack, chairman for nine years of the subcommittee on transformer standardization of American Standards Association, was 1931 recipient of the company's Charles A. Coffin Award.

John M. Casey has been appointed utility market sales manager for Four Wheel Drive Auto Co to succeed **T. G. Shedore** who is retiring.

OBITUARY

Walter C. Heston, 63, former Pacific Coast editor of Electrical World and engineering editor of Electrical West since 1948, died recently in Berkeley, Calif., following a heart attack. Active in the western electric utility industry, he was previously with Pacific Gas & Electric Co, Northern California Electrical Bureau, and Portland Railway Light & Power Co, a predecessor of Portland General Electric Co.

Edwin H. Iverson, 54, former electrical engineer for Puget Sound Power & Light Co, died recently in Seattle, Wash.

Ray W. Porter, 67, former operating vice president of the Central Division of Niagara Mohawk Power Corp, died recently. He retired in 1955 after 36 years' service with the utility.

SANGAMO AUTO VAR CAPACITOR EQUIPMENT

low cost ...light weight ...quick and easy to install

Twelve-unit multi-row Auto Var Capacitor Equipment for crossarm mounting. Assembly is light in weight—easy to install on crossarm.

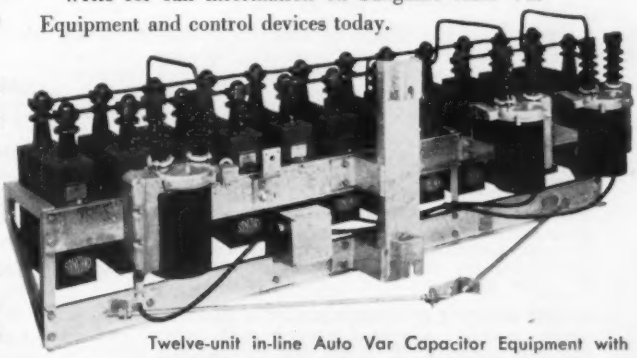
Sangamo Auto Var Equipment is completely assembled for automatic operation. It is wired at the factory. It enables capacitor installation on distribution circuits in amounts approximating peak load kilovars where permanent connection of such capacitors would be disadvantageous at light loads.

Both multi-row design for crossarm mounting, and in-line design for direct-to-pole mounting, are available. Equipment includes hot galvanized steel rack, capacitor units, electrically operated oil switches, junction box and all wiring. Switches can be omitted if desired.

Auto Var Equipment can be supplied in all distribution voltage ratings and with standard Kvar ratings ranging from 225 to 600 Kvar. Choice of either 25 Kvar or 50 Kvar individual capacitors.

Buy Sangamo Time Switches and Lincolntrols for automatic control of Auto Var Equipment as a function of time, volts, amperes, watts or vars.

Write for full information on Sangamo Auto Var Equipment and control devices today.



Twelve-unit in-line Auto Var Capacitor Equipment with electrically operated oil switches. Close coupling to pole gives low bending moment.

SANGAMO Electric Company

SPRINGFIELD, ILLINOIS

PC56-4

MEETINGS CALENDAR

AUGUST

ALASKA RURAL ELECTRIC COOPERATIVE ASSOCIATION—Annual Meeting, Palmer, Alaska, Aug. 9-11.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Heat Transfer Division, First National Conference, Pennsylvania State University, Aug. 11-15.

WESTERN ELECTRIC SHOW AND CONVENTION—Pan Pacific Auditorium and Ambassador Hotel, Los Angeles, California, Aug. 21-24.

SEPTEMBER

NORTHWEST PUBLIC POWER ASSOCIATION, INC—Meter School, Oregon State College, Corvallis, Oregon, September 10-14; Accounting Section, Cascadian Hotel, Wenatchee, Washington, September 11-14.

EDISON ELECTRIC INSTITUTE—Organization Meeting, sponsored jointly with AGA, Edgewater Beach Hotel, Chicago, Ill., Sept. 13-14; Industrial Relations Round Table Conference, Drake Hotel, Chicago, Ill., Sept. 17-19; Meter & Service Committee, Purdue University, Lafayette, Ind., Sept. 24-26.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS—38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—3rd Annual Electrical Conference of the Petroleum Industry, Kansas City, Mo., Sept. 17-19.

ILLUMINATING ENGINEERING SOCIETY—National Technical Conference, Hotel Statler, Boston, Mass., Sept. 17-21.

INSTRUMENT SOCIETY OF AMERICA—11th Annual Instrument-Automation Conference and Exhibit, New York Coliseum, Sept. 17-21.

• **MISSOURI VALLEY ELECTRIC ASSOCIATION**—Accounting Conference, Lassen Hotel, Wichita, Kansas, Sept. 20-21.

ATOMIC INDUSTRIAL FORUM, INC—3rd Annual Forum Conference and 2nd Annual Trade Fair, Morrison Hotel and Navy Pier, Chicago, Ill., Sept. 24-28.

PENNSYLVANIA ELECTRIC ASSOCIATION—Annual Meeting, Hotel Wm. Penn, Pittsburgh, Pa., Sept. 25-26.

ELECTRIC COMPANIES PUBLIC INFORMATION PROGRAM—Steering Committee, Blackstone Hotel, Chicago, Ill., September 26; Workshop Conference, Blackstone Hotel, Chicago, Illinois, September 26-28.

OCTOBER

EDISON ELECTRIC INSTITUTE—Prime Movers Committee, Radisson Hotel, Minneapolis, Minn., Oct. 1-3; Area Development Committee Meeting, Oct. 3, and Area Development Committee Workshop, Radisson Hotel, Minneapolis, Minn., Oct. 4-5; Electrical Equipment Committee, Hotel Statler, Cleveland, Ohio, Oct. 15-16; Transmission and Distribution Committee, Hotel Statler, Buffalo, N. Y., Oct. 18-19.

ILLINOIS INSTITUTE OF TECHNOLOGY—12th Annual National Electronics Conference, sponsored jointly by AIEE, Institute of Radio Engineers, University of Illinois, and Northwestern University, Hotel Sherman, Chicago, Ill., Oct. 1-3.

NATIONAL ELECTRONICS CONFERENCE—12th Annual Conference and Exhibition, Hotel Sherman, Chicago, Ill., Oct. 1-3.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5.

CANADIAN ELECTRICAL MANUFACTURERS' ASSOCIATION—12th Annual Meeting, Sheraton Brock Hotel, Niagara Falls, Ontario, Canada, Oct. 3-5.

MISSOURI VALLEY ELECTRIC ASSOCIATION—Sales and Rural Conference, Hotel President, Kansas City, Mo., Oct. 3-5.

STANDARDS ENGINEERS SOCIETY—Fifth Annual Meeting, Hotel Willard, Washington, D. C., Oct. 3-5.

INDIANA ELECTRICAL ASSOCIATION—Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 3-5.

SOUTHEASTERN ELECTRICAL EXCHANGE—Sales Conference, Tides Hotel & Bath Club, St. Petersburg, Fla., Oct. 3-5; Accounting Meeting, Hotel Seville, Miami, Fla., Oct. 10-11.

INTERNATIONAL ASSOCIATION OF ELECTRIC LEAGUES—Sheraton-Cadillac Hotel, Detroit, Mich., Oct. 3-6.

PENNSYLVANIA ELECTRIC ASSOCIATION—Electric Equipment Committee, Arlington Hotel, Binghamton, N. Y., Oct. 4-5.

ROCKY MOUNTAIN ELECTRICAL LEAGUE—Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo., Oct. 7-10.

INTERSTATE POWER CLUB—Hotel Martinque, New York, New York, Oct. 8.

ILLINOIS INSTITUTE OF TECHNOLOGY—Conference on Computer Applications, Chicago, Ill., Oct. 9-10.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL—National Power Use Workshop, Milwaukee Auditorium, Milwaukee, Wis., Oct. 15-16.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Electrification of Machine Tools Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 22-24.

UNIVERSITY OF TEXAS—Ninth Power Distribution Conference, University Batts Auditorium, Austin, Tex., Oct. 22-24.

AMERICAN STANDARDS ASSOCIATION—38th Annual Meeting and 7th National Conference on Standards, Hotel Roosevelt, New York, Oct. 22-24.

NATIONAL SAFETY COUNCIL—44th National Safety Congress & Exposition, Chicago, Illinois, Oct. 22-26.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS—South Central Region Meeting, M & M Building, Houston, Texas, October 23-26.

NORTHWEST PUBLIC POWER ASSOCIATION—Power Use Section, Franklin PUD Auditorium, Pasco, Wash., Oct. 25-26.

MONTANA STATE RURAL ELECTRIC COOPERATIVE ASSOCIATION—Annual Meeting, Lewistown, Mont., Oct. 29-31.

NOVEMBER

NATIONAL RURAL ELECTRIFICATION COOPERATIVE—Region Nine Annual Meeting, Davenport Hotel, Spokane, Washington, Nov. 12-13.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—Annual Meeting, Traymore Hotel, Atlantic City, New Jersey, Nov. 12-16.

EDISON ELECTRIC INSTITUTE—Industrial Relations Committee, EEI Headquarters, New York, N. Y., Nov. 15; Accident Prevention Committee, Statler Hotel, Hartford, Connecticut, November 26-28.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—22nd National Exposition of Power and Mechanical Engineering, Coliseum, New York, N. Y., Nov. 25-30.

• **GREAT LAKES CONFERENCE OF RAILROAD AND UTILITIES COMMISSIONERS**—First Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va., Nov. 29-30.

DECEMBER

INSTITUTE OF RADIO ENGINEERS—2nd Instrumentation Conference, Biltmore Hotel, Atlanta, Ga., Dec. 5-7.

EDISON ELECTRIC INSTITUTE-AMERICAN GAS ASSOCIATION—1957 Conference Planning Committee, EEI-AGA Headquarters, New York, N. Y., Dec. 6-7.

• Additions this week.

LOW VOLTAGE SWITCHGEAR through 600 v a-c, 250 v d-c, 15,000 through 150,000 amp interrupting, 6000 amp continuous.

UNIT SUBSTATIONS—primary and secondary, indoor and outdoor construction—in all standard ratings, dry, askarel or oil transformers.

ISOLATED PHASE BUS through 138 kv and 10,000 amp.

METAL-CLAD SWITCHGEAR in ratings from 2400 v through 15 kv, 50 through 500 mva interrupting and 2000 amp continuous.

INDIVIDUAL BREAKERS, a-c and d-c, 15,000 through 150,000 amp interrupting, 6000 amp continuous.

NONSEGREGATED PHASE BUS through 15 kv and 6000 amp.

Economical: an I-T-E Power Package

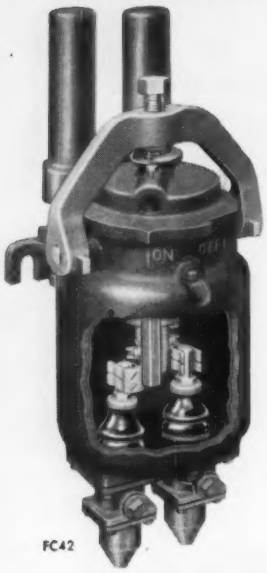
An I-T-E Power Package includes the complete power handling facilities for a new construction project, building addition, or expansion of electrical service—one unit or a complete system for every application from generation to end use. You save in sound planning, easier installation, coordinated delivery, and assured performance—a better investment in every way.

For more information, contact the I-T-E sales office nearest you or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY
Switchgear Division

I-T-E

Isolate load circuit faults with G&W Type "FC" Oil Fuse Cutouts



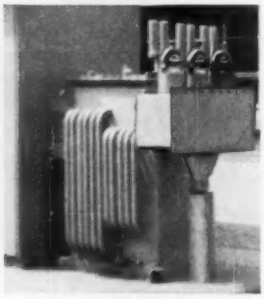
FC42

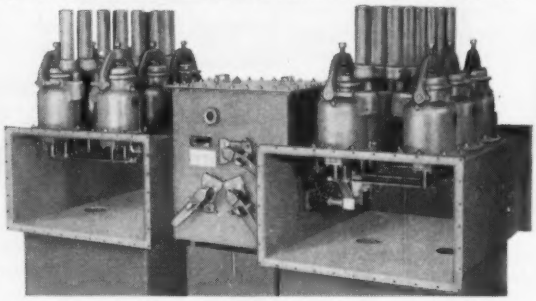
All steel enclosure, hermetically sealed—oil filled, protects men and equipment by safely withstanding high pressures of high voltage fuse clearing a heavy short circuit. In addition to the main purpose—a pressure tight enclosed fuse—the device serves as a full load break oil switch, three phase with gang-operated mechanism. Switching contacts are Beryllium copper. Fuse links are simple, inexpensive and easily replaced. Cable entrances are interchangeable—wiping sleeve, stuffing box or porcelain.

FC42

Three sizes		Interrupting capacity per cutout
FC31	2500 volts, 100 amp.	6000 amps. at 2.5 Kv.
FC42	5000 volts, 200 amp.	16000 amps. at 2.5 Kv.—8000 amp. at 5 Kv.
FC61	8000 volts, 100 amp.	5000 amps. at 8 Kv.

SAVE INSTALLATION LABOR BY COMBINING "FC" CUTOUTS WITH OTHER EQUIPMENT





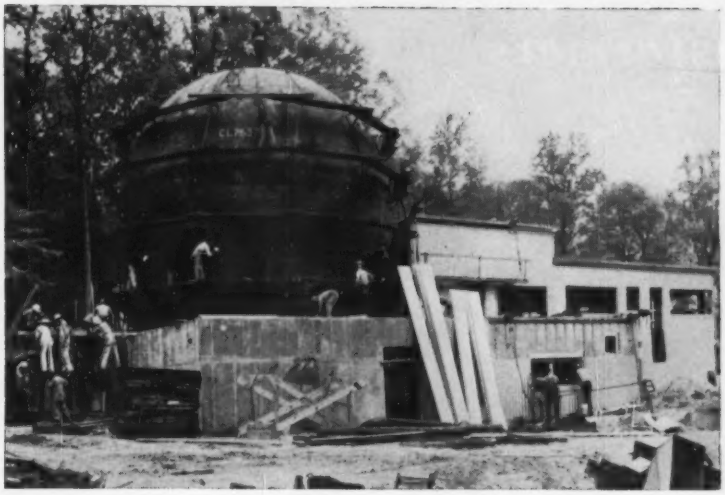
Send for Bulletin CB56

Call in our representative.

G&W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois,
Representatives in principal cities of U. S. A.
Also made in Canada by Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

G&W

C561



Army Atom Plant Takes Shape

This vapor container for the Army Package Power Reactor now welded together at Fort Belvoir, Va., is designed to withstand maximum pressure which could be exerted in the occurrence of an "incident." To go into operation early next year, the APPR project is a 2,000-kw pressurized water type, components of which can be carried by air freight for quick assembly anywhere in the world. The vapor container is 64 ft high and 36 ft in diam, having walls of ⅞-in. steel plate that will be reinforced with 2 ft of concrete.

NEWS IN BRIEF (*Continued from page* 24)

the past six months, WWP has also purchased Stevens County PUD system, operating in sparsely settled areas of northeastern Washington.

Carolina Power & Light Co has agreed to spend $585,000 for portions of **Greenville (N. C.) Utilities Commission's** system in Craven and Beaufort counties. The sale was proposed by City Manager Leonard Bloxam . . . **Niobrara Electric Association** and **Pacific Power & Light Co** have filed a joint application with Wyoming PSC to transfer the northeastern third of Converse county from NEA to PP&L. The firms alleged PP&L could better serve the remote area because of the proximity of its lines . . . Indiana PSC has authorized **Indiana & Michigan Electric Co** to take over service in Perry Township, Allen county. **Whitley County Rural Electric Corp** has consented to the change.

REA CO-OPS and MUNICIPALS

City Council of Hamilton, Ohio, has approved an $840,500 bid from **Westinghouse Electric Corp** for construction of a 20,000-kw turbine generator for the municipal electric plant expansion. Five bids were received . . . Iowa state tax study committee is considering a **proposal to tax Iowa Rural Electrification Administration lines** on same assessment yardstick as lines of private utilities. The bill, to be submitted to the 1957 legislature, provides that the tax commission "shall give due consideration to the number of customers per mile of line and to cost of such lines in areas where necessary cost of construction was high compared to potential electrical consumption."

Colorado-Ute Electric Association, group of four southwestern Colorado REA co-ops, has agreed on Nucla as site for its proposed 3-unit, $10-million plant after almost splitting up over the location. Edna Coal Co of Denver has agreed to the group's terms for strip coal mining near Nucla.

HYDRO

Central Vermont Public Service Corp petitions Federal Power Commission to approve construction of proposed $2.4-million hydroelectric generating plant on Lamoille River.

Bonneville Power Administration spokesman estimates expenditure of $1-million a day is necessary from now on for more power projects on Columbia River to meet Pacific northwest's power demands. He said this figure does not include projects licensed or under construction at present.

Hoover Dam's power generation during the coming year may run about 60% of the firm energy commitment, as it was last year, because of Lake Mead's record low level caused by three consecutive years of below-average runoff . . . **Northern Lights, Inc,** Idaho, has asked FPC for preliminary permit for a hydro-electric project on the Yaak River, tributary of the Kootenai River, in Montana. The two-development project would consist of 6,650-kw Five Mile Dam and 3,700-kw Yaak Falls Dam and would replace power now purchased from BPA.

Portland General Electric Co has applied for a state license to construct $19-million, 78,000-kw North Fork-Faraday hydroelectric projects on Clackamas River . . . Boundary dispute between Alabama and Georgia has delayed Alabama Public Service Commission action on **Georgia Power Co's** application for a proposed dam on the Chattahoochee River, which runs between the two states.

Southern half of Vancouver Island, B. C., was blacked out and some $10,000 worth of damage caused when a 12-ft-diam. wooden penstock burst above **B. C. Power Commission's** John Hart Dam at Campbell River, sending tons of flood water cascading down the mountainside. The break started when penstock staves worked loose.

Portland General Electric Co is in violation of Oregon's water use laws in proceeding with construction of the Pelton hydro project on the Deschutes River under FPC license but without state sanction in the opinion of the Oregon attorney general. "The granting of the federal permit does not override the effective state law. . . . (PGE) has submitted itself to the jurisdiction of the state hydroelectric commission and the . . . Oregon water law by making application for a permit and license. These application were denied by the Oregon hydroelectric commission . . . ," said the opinion of the attorney general.

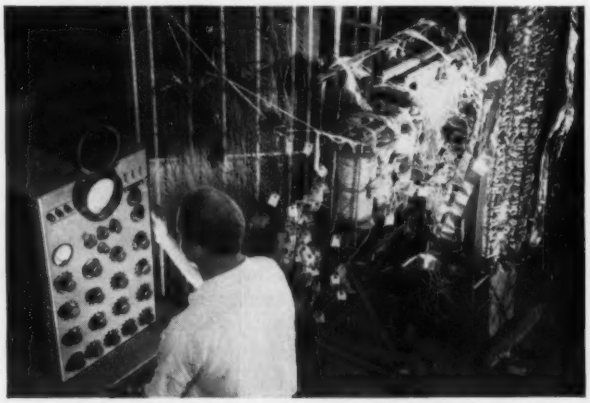
OPTIMUM INVESTMENT* *Power Transformers*

*Optimum Investment

Your assurance of lower long-term cost, plus greater dividends from your investment in General Electric large power transformer, through:

- **LOW ENGINEERING COST:** G-E field services reduce your engineering expense.
- **LOW PURCHASE COST:** Skill to produce optimum design for each application.
- **LOW INSTALLATION COST:** Upright shipment, one-piece tank speeds handling.
- **LOW OPERATING COST:** Permanent, better characteristics for lasting economy.
- **LOW MAINTENANCE COST:** Product improvements, greater reliability reduce outages.

INTERNAL THYRITE®, an amazing non-linear resistance material, gives ideal overvoltage protection to partial or complete sections of transformer windings. Located next to and connected in parallel with the coil, Thyrite acts like a safety valve and by-passes excessive currents and voltages.



ELECTROMAGNETIC MODEL determines impulse voltage distribution in a transformer before the actual unit is built. Due to remarkable similarity in characteristics between model and completed transformer, the unit can then be built with the correct amount and location of insulation.

Improvement of Power Transformer Design Features Leads to . . .

A 300% INCREASE IN RELIABILITY; UTILITY SAVINGS OF $10,000,000 IN 1955

Product improvements speed trend to three-phase units, reducing utility capital investment in transformers

How reliable are today's power transformers? A recent study indicates that General Electric power transformers have become three times more reliable in just twenty years.

ANALYSIS OF RECORDS was made to determine how many transformers, 15,000 KVA and above, succumbed to lightning or faults within the first five years of service. Transformers built in two periods—1928 through 1930, and 1948 through 1950—were compared. G-E records show that the number of failures, already small, was further reduced by 75% on the basis of the number of units shipped, and 84% on a KVA-shipped base. Also, since 1950, further product improvement has reaffirmed this 300 per cent increase in power transformer reliability.

During the late '20's, many installations consisted of single-phase, rather than three-phase units. As transformers became more reliable, the trend to three-phase installations grew, saving users of General Electric power transformers over $10,000,000 in 1955 alone—comparing units actually purchased to what would have been bought based on the utility practices of the late '20's.

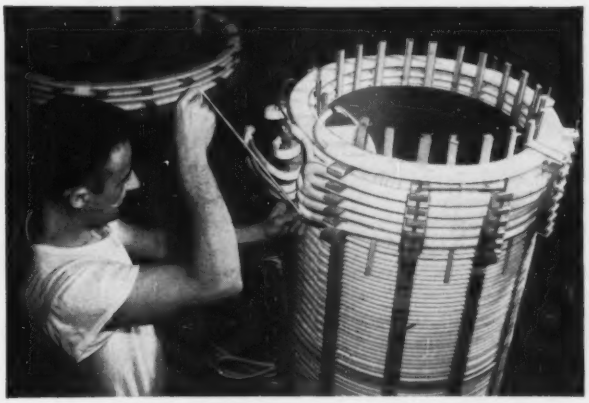
EXTENSIVE DEVELOPMENT of new and better G-E power transformers features has keynoted this trend. For instance, Thyrite* resistors help guard against winding overvoltages caused by line surges; electrostatic shielding helps prevent damage from lightning impulses; electromagnetic models assure the use of proper impulse-resisting insulation; and special core and coil bracing keeps the unit rigidly strong. All contribute to improved reliability.

These are examples of features designed to reduce your maintenance costs. There are more. And, combined with other features that give you low engineering, purchase, installation, and operating costs, they make your General Electric Power Transformer an *Optimum Investment.* General Electric Co., Schenectady 5, N. Y. 421-44

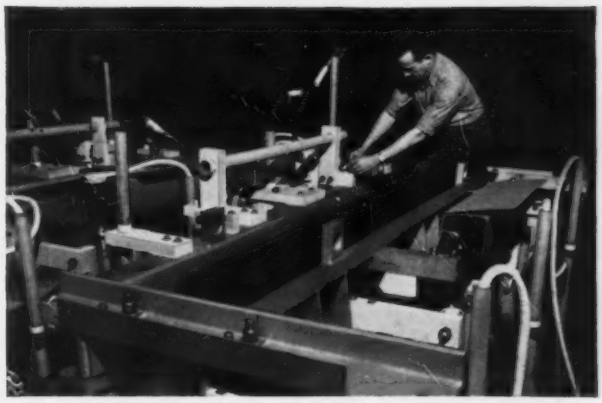
*Registered Trademark of General Electric Co.

Progress Is Our Most Important Product

GENERAL ELECTRIC



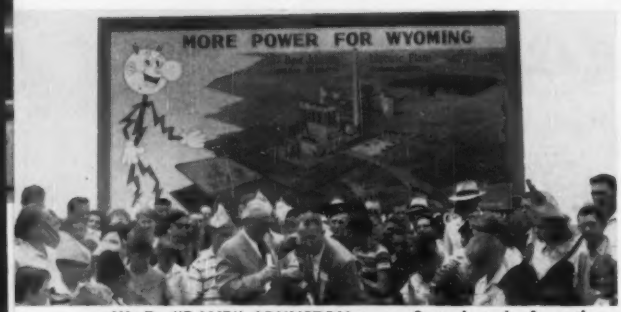
ELECTROSTATIC SHIELDING combats the tendency of lightning-caused impulse voltages to overstress the insulation by distributing themselves across only a few turns of the winding. Shielding evens out the voltage distribution throughout the winding and helps prevent insulation breakdown.



CORE AND COIL CLAMPING forms a rigid, compact structure of the myriad of component parts of the assembly. As surges and fault currents course through a transformer, exerting severe stresses on the assembly, the clamping resists these forces and helps protect the assembly from being distorted or damaged.

'Indians' entertain 4,000 at groundbreaking as . . .

Pacific P&L Begins Johnston Plant



W. D. "DAVE" JOHNSTON turns first shovel of earth as Paul B. McKee, PP&L president, looks on

WESTERN BARBECUE LUNCH for all visitors was held in five huge tents following groundbreaking

Cowboys, Indians, and jet aircraft entertained more than 4,000 persons who turned out for the recent groundbreaking ceremony at Pacific Power & Light Co's 100,000-kw Dave Johnston plant near Glenrock, Wyo.

The arriving guests were met by a troop of cowboy-attired horsemen who guided them to the parking lot. The first round of entertainment consisted of a band concert and a salute by jet aircraft of the Air National Guard. Later, authentic Indian dances were presented by the Ko-share Indian dancers, a boy scout troop from Colorado.

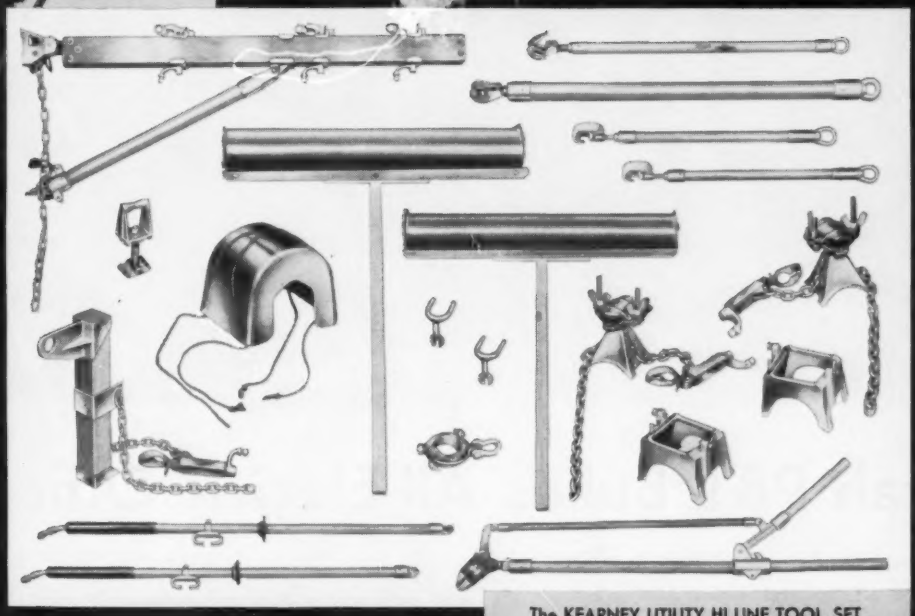
The coal-fired plant was named in honor of W. D. "Dave" Johnston, Pacific Power vice president and Wyoming electrical engineer. In the official naming ceremony, Paul B. McKee, president of Pacific Power, said that the Dave Johnston plant "is a dynamic tribute not only to him but to all the stalwart men and women whose courage and initiative have built this state."

After the ceremony spectators joined in a western barbecue luncheon in five huge tents which lent the atmosphere of a gala carnival. Following lunch there were trips to the fields of sub-bituminous coal lying about 14 miles north of the plant site.

Preparation of the plant site has begun. Construction of foundation work, water conduits, and structures will start this year. Plant is slated for service in Oct, 1958.

The plant will consist of one 100,000-kw unit with space for ultimate capacity of 400,000 kw. It will burn pulverized coal delivered by rail or truck from nearby fields that have an estimated reserve of 50-million tons.

Work hot lines safely...



The KEARNEY UTILITY HI LINE TOOL SET CATALOG No. 4778-6 is especially convenient and efficient for handling distribution work.

WITH KEARNEY Hi-LINE TOOLS

Service interruptions cause customer inconvenience . . . and revenue loss. KEARNEY Hi Line Tools are designed *for working hot lines safely,* by tool engineers experienced in hot line work.

Each tool is manufactured for specific applications and uses, and must pass rigid tests. This means safety for your crews.

If you have any unusual hot line problem on your system, KEARNEY's skilled field servicemen will be glad to demonstrate Hi Line Tools and help train linemen in their use.

JAMES R. KEARNEY CORPORATION • 4224-42 Clayton Ave., St. Louis 10, Mo. • *Canadian Plant:* Guelph, Ontario

for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify KEARNEY PRODUCTS
JAMES R. KEARNEY CORPORATION ST. LOUIS MO. GUELPH, ONT.
The Mark of Quality

Utah P&L Builds All-Electric Office

Modern building for Ogden Division has 158-kw connected load that includes 12 heat pumps, electric stairway, electric sidewalk heating

Utah Power & Light Co literally took a page from its own book in building and equipping a modern office building for the Ogden Division.

The company went all-electric almost in every direction to provide the maximum in customer and employee convenience. Connected load of the building amounts to 158 kw, single and 3-phase. This load includes high-quality lighting, 12 heat pumps for year-round heating and cooling, germicidal lamps, an electric stairway, and electric heating under the sidewalk.

The Ogden Division covers 2,500 sq miles and serves about 38,000 customers of which 33,575 are farm and residential. Of the 145,000 people in the division, some 65,000 live within the city limits of Ogden, the division headquarters. To serve these customers the new office building provides 17,000 sq ft for accounting, customer billing, general business office, and business development and home economics departments. Cost was $450,000.

Customers who arrive by automobile are afforded two drive-in pay windows, through traffic lanes to eliminate backing or turning, and a paved and well-lighted 40-car parking lot. The sidewalk has an electric heating grid for the melting of snow and slush. Main doors are operated electrically to open either way at the touch of a finger.

Widespread use of field stone planter boxes and ceiling-to-floor aluminum shadow boxes gives a touch of informality to the customer waiting room in which lounges, chairs, and a desk are placed. Diffused light is provided by recessed fluorescent fixtures in the customer waiting and service rooms, as well as in the employee working areas and the 200-person auditorium. Additional lighting in the auditorium is obtained through adjustable, louvered reflector flood-lamp fixtures mounted over the stage area and recessed incandescent lens units for wall lighting.

Both the auditorium and the accounting office on the first floor have horizontal louvers outside the windows to control the light. The auditorium is equipped with a folding fabric door to divide it into two rooms. It also has a public address system and television viewing facilities.

Equipment in the all-electric auditorium includes a refrigerator, freezer, range, automatic dishwasher, garbage disposer, and automatic washer and dryer.

Access to the business development and home economics offices on the second floor is provided by an electric stairway which can carry 75 people per minute. The stairway is reversible and can be adjusted to move up or down.

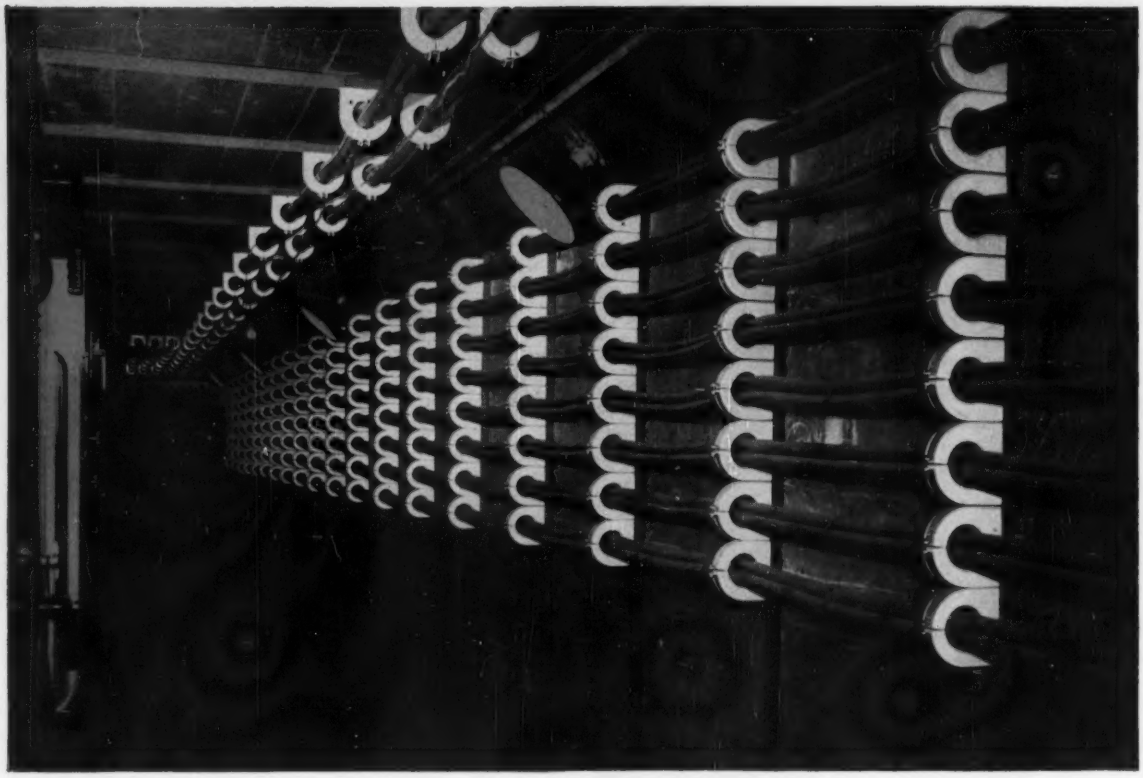
Year-round heating and air conditioning is provided by 12 air-to-air heat pumps that serve seven separate zones. Air supplied to the building is cleaned by eight electrostatic cleaners and sterilized by germicidal lamps.

Daytime attractiveness of the modern building is enhanced by finished portions in glazed terra cotta of pastel green and buft Normandy brick with facings of quarry stone. Liberal use of aluminum-encased glass in the front of the building, plus exterior lighting, gives the structure a showcase effect at night.

CUSTOMER SERVICE ROOM illustrates the spacious treatment and diffused fluorescent lighting used throughout the building. The customer waiting room has lounges, chairs, and a desk

YEAR-ROUND COMFORT is provided by 12 air-to-air heat pumps that serve seven zones in the new office building. Incoming air is filtered electrically and sterilized by germicidal lamps.

SOUND-PROOF AUDITORIUM has an all-electric stage, public address system, television viewing facilities, and special lighting. The auditorium may be divided by a folding fabric door



for maximum dependability . . .

world's most modern shell plant specifies KEYSTONE 5KV CABLES

Available with either copper or aluminum conductors

Nothing was spared to provide the surest and most adequate supply of electrical energy for the huge motors, pumps and other equipment that make the Scranton Ordnance Plant, operated by the United States Hoffman Machinery Corporation, the largest and most modern of its type in the world.

In production less than 18 months after the project was approved, the plant makes extensive use of Keystone-Hazaprene 5kv non-shielded cable.

A typical application of this top-quality, yet economical cable is found in the plant's forge shop. There, 1/conductor 750,000 mcm Keystone-Hazaprene 5kv non-shielded cables feed power from 3 - 5000 kva transformers to 12 - 600 hp and 12 - 450 hp pumps which provide hydraulic pressure for the main drawing and forging operations. These dependable power feeder cables are installed in interconnecting underfloor tunnels like the one shown above.

You, too, can use Keystone cables to advantage in your operation. Ask for Bulletin EW-463 for full details or write Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, N. J.

2954

HAZARD
insulated cables

PRODUCT OF OKONITE RESEARCH

What Will High Speed Dryers Do to Utilities?

- **Impact on urban lines and loads not much different than from standard clothes dryers, Middle West study finds**
- **30-min integrated demand is 4.7 kw, usage runs more than 100 kwhr per month**
- **Small rural transformers pose problems**

How is the new high-speed clothes dryer affecting utilities loads and distribution systems? What is the reaction of utility engineers and sales people?

Middle West Service Co has published a preliminary report on a home-use study of one model. The report furnishes leads on answers to the questions above that the 8,700-w, 240-v device poses for utilities. Based on findings uncovered since August 1955, here's what the Chicago consulting firm discovered in tests on Whirlpool-Seegar Corp's Kenmore model:

- Starting impact of the high-speed dryer is very little greater than from standard models.
- In normal urban use, 30-min integrated demand of the new model is 4.7 kw, or about the same as the standard dryer.
- Most distribution engineers are not concerned about impact of the high-speed device on urban systems.
- Sales department attitudes generally are favorable.
- Usage for the high-speed model will probably run above 100 kwhr per month; for standard dryers it ranges between 50 to 70 kwhr.
- Average drying time for the device is about 16 min; coincidence factor appears to be between 10 to 20%.
- Maximum current flow at any time is 48 amp; this reduces in a few cycles to 39 amp.
- In rural areas relatively small, separate 5-kva transformers will pose problems when the new dryer comes on the line. Transformer changeouts will be required more often.

Based on these findings, Middle West recommends that additional urban tests be made to find:

1. Probable daily load curve of urban dryer usage at the group level.

2. Probable diversity among several operating dryers.

3. Minimum transformer size in urban areas for various number of operating dryers on a single secondary.

Similar tests were recommended for rural areas.

Middle West capsulized previous test results in its report, most of them made by large utilities. Consumers Power Co was running charts on three of six dryers in operation. In one instance, two were connected on a single long secondary fed by a 15-kva transformer which already was near the over-load stage in serving about 25 customers. With the two dryers connected, some changes had to be made.

In Miami no trouble was experienced on two dryers with G-9 recording demand meters, according to Florida Power & Light Co.

Two Types on 25-Kva

Five high-speed and five normal-speed dryers were served from the same 25-kva transformer in a test of Indiana & Michigan Electric Co at Benton Harbor, Mich. The transformer was at the end of a 2,400-v single-phase primary branch near the end of a long 4,160-v grounded neutral primary. All the dryers operated satisfactorily although voltage was near the limits of acceptable quality. The company said that normally the secondary would be split or a larger transformer installed.

Meanwhile, six separate rural electric cooperatives in Iowa had undertaken tests. Two that Middle West inspected revealed that a 10-kva transformer had replaced a burned-out 5-kva but whether it was due to the dryer wasn't certain. Another dryer served by a 5-kva transformer had an 8% voltage drop which was just within the system's limits.

According to Middle West, the Kenmore high-speed dryer has these operating characteristics: Input is 8,700 w at 240 v, the two 240-v heating elements total 8,400 w, normal amperage is 39, maximum is 48 amp which is described as a transient current that reduces in a few cycles to 39 amp, motor starting current is 40 amp (A centrifugal switch on motor keeps heating element off during inrush of motor's starting current.) Minimum service entrance requirement is 60 amp (some utilities require 100 amp), and Sears, Roebuck & Co requires purchasers to conform. In cases where service entrance or wiring is inadequate, one heating element can be disconnected making the dryer usable at normal speed.

In urban areas Middle West found maximum voltage drop is 4 to 5% at the dryer. Out on the secondary and at the transformer it is somewhat less.

Give Small Dealer What He Needs, Says Price

Some advice on how utilities can better help the small appliance dealer was voiced recently by Harry Price, past president, National Appliance and Radio-TV Dealers Association. Although he directed his remarks to an eastern meeting of American Gas Association members, they might well hold for electric utilities, too.

Price's recommendations: Give the small dealer financial guidance and service help; provide him with advertising and sales promotion guidance; help him develop sales leads. "Find out what he needs and give him what he needs—not what you think he needs," he declared.

Electricity Up, but Ranges Still Gas in Phoenix

The trend toward appliance automation is well reflected in a Phoenix, Ariz., survey which shows that for the first time automatic washing machines have climbed ahead of the regular roller wringer machines. An impressive 46% of Phoenix families reported they own automatic washers

(*Continued on page* 52)

This Window Display Tripled Small Appliance Sales

Hank Bullock says that window displays pay off. And he can prove it by sales rung up in his till!

Bullock, manager of McMahan's Furniture Stores' El Cajon outlet in San Diego County, says the display above tripled sales of small appliances during its 10-day run. And, several weeks later, small appliance sales were running about 50% ahead of their old pre-display levels.

As further evidence, the display won for the beaming manager a free trip to Las Vegas and a $25-first place prize in the non-professional category of the Bureau of Home Appliances of San Diego County's contest. The Bureau reported similar successes from nearly all stores entered.

Electricity Up in Phoenix

(*Continued from page* 51)

while wringer washers dropped to a little better than one-third (36%.)

Nearly twice as many people own automatic dishwashers as compared to a year ago. Gas ranges still maintain a commanding lead with 83% of the sales.

Power lawn mowers gained considerably—42% reporting ownership for an 8% climb over last year. Of families buying air conditioners, 35% made purchases during 1955. Television sets are owned by 89% of families interviewed, with the 17-in. set slipping in popularity in favor of the 21-in. screen.

Australia Claims First All-Electric Community

Is Southern California's Linda Lyle Estates (EW June 13, 1955, p. 134) really "the world's first all-electric community"?

From Australia comes news of a community near Adelaide where 400 all-electric homes already have been built, with 1,000 more under construction. What's more, says F. W. Tideman, consumers service engineer for the Electricity Trust of South Australia, it is hoped the community will eventually accommodate 75,000 to 90,000 persons. Known as the Satellite Town of Elizabeth, it permits no gas and "the whole of the high tension and low tension electrical distribution will be underground."

"Each house being built (by the South Australian Housing Trust) is equipped with a modern three-plate electric stove, a 1½-gal electric sink heater, 12-gal electric wash boiler, and a three-phase instantaneous type electric bath heater."

Adds Tideman: "A proportion of the homes will have a 60-gal electric off-peak hot water system in lieu of the sink water heater, wash boiler and bath heater. Refrigerators, electric fires and washing machines are, of course, being installed by the tenants or owners, although provision has been made for the use of a fuel fire if required."

Connected load per house is about 27 kw plus an estimated 5 kw for lighting, radiators, etc, he says.

Here in the U. S., several other all-electric developments have gotten underway since the Linda Lyle announcement, notably in Lima, Ohio, other parts of Midwest and South.

S & S SHORTS

Contractors' Wiring Booklet

A 16-page booklet, "Wiring for Residential Outdoor Lighting," is designed for contractors. It contains suggested uses for outdoor fixtures and outlets, details on wiring installation, and tables. Publication 15-116, General Electric Co, Construction Materials Division, Bridgeport 2, Conn.

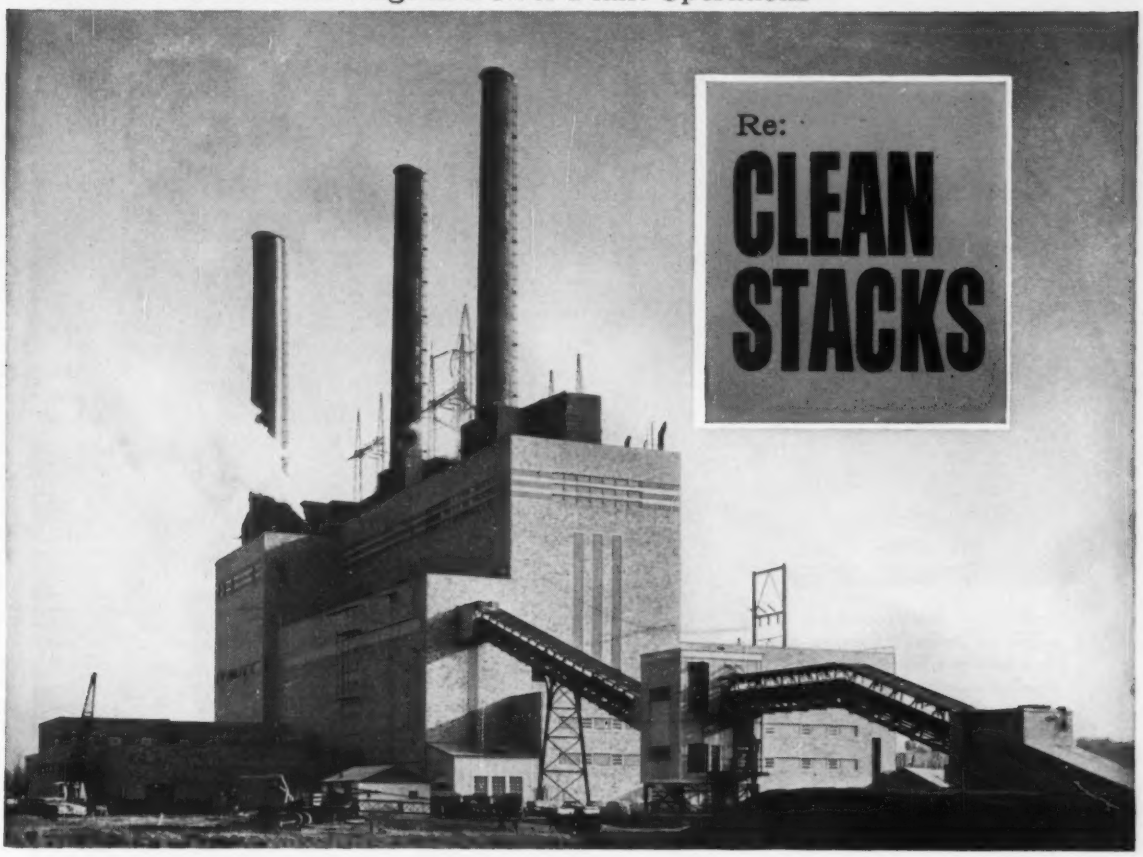
Attend Lighting Meet

Some 23 utility lighting men from nine eastern and midwestern states recently attended a three-day conference at the Holophane Engineering Center, Newark, Ohio. Holophane is laying plans for more such conferences which cover the study of light sources, their applications, and markets.

Low Cost "Refrigeration Center"

A steel supporting "K" frame which permits combining wall refrigerator, roll-out freezers, and cabinets into a free-stand "refrigeration center" has been developed by General Electric Co. Frame is available now, will cost under $50. GE sees a big market for it in the kitchen remodeling.

Research for New Savings in Power Plant Operations

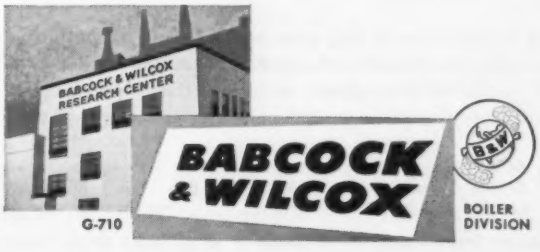


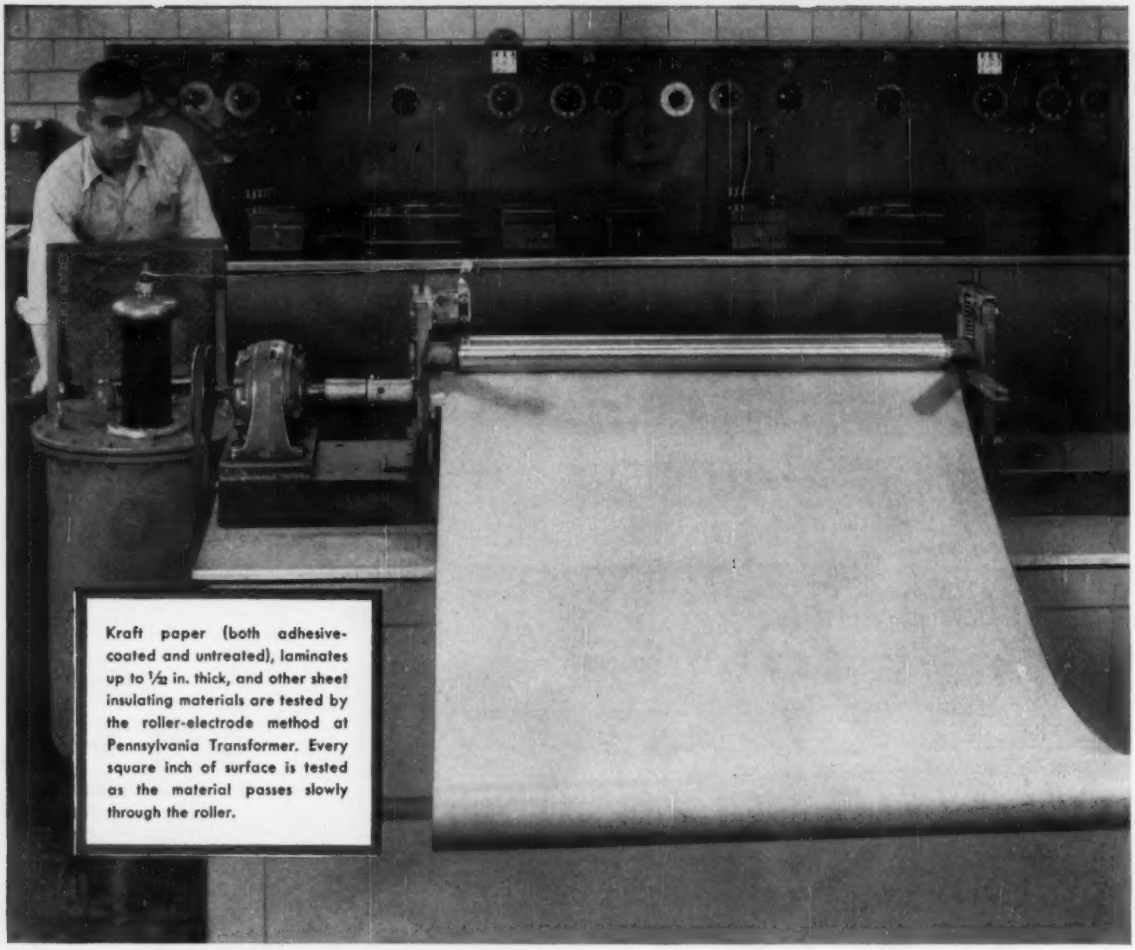
HOW MANY MILLS PER KILOWATT-HOUR?

Public utility men, always anxious to eliminate air pollution and improve community relations, have spent many millions of dollars to hold fly-ash emission and other stack discharges within permissible limits. Being equally conscious of the need to hold the line on cost of power plant construction and operation, they are naturally seeking ways to cut the costs of obtaining clean stacks.

B&W's concern with clean stacks is reflected in its own research and in gains already made in both coal- and oil-firing. A major contribution was the slag-tap furnace which permitted recovery of much of the ash in the furnace as slag. A more recent development, the Cyclone Furnace, allows only about 10 per cent of the ash to enter the gas stream. Used with simplified precipitators, it reduces fly-ash discharge to exceedingly small amounts. Improved oil burners also mean clean stacks. In addition, research on the application of additives to the fuel oil indicates marked reduction in formation of sulfur trioxide with corresponding reduction in discharge of corrosive acids and ash particles.

Many questions remain to be answered, and time and money must be spent to find economical solutions that will stand up in service. In B&W's completely equipped Research Center at Alliance, Ohio, complete pilot units are built and operated under field conditions in a full-scale effort to extend the knowledge of combustion methods, stack discharge, and steam generation. Developments such as the Cyclone Furnace, improved pulverized-coal firing, the Cyclone Steam Separator, materials for higher pressures and temperatures, and the Universal Pressure Steam Generator are some of the better known results of this unique program. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.





Kraft paper (both adhesive-coated and untreated), laminates up to 1/32 in. thick, and other sheet insulating materials are tested by the roller-electrode method at Pennsylvania Transformer. Every square inch of surface is tested as the material passes slowly through the roller.

He's rolling dielectric strength into your POLE STAR coil—Here's how...

Unlike other insulation testing methods in wide use today, the roller-electrode test introduced by Pennsylvania assures accurate testing of every square inch of material. Voltage applied through the upper roll (the lower roll is grounded) converts the harmless-looking device pictured into a torture rack that is *certain* to reveal any existing weak spots — whether blisters, pin holes, inclusions of foreign matter, or some other defect in the material.

The roller-electrode test measures dielectric strength of insulation in the industry-approved units of volts-per-mil — that is, the amount of voltage that a particular thickness of a given insulating material is capable of taking without a breakdown. Rigid volts-per-mil minimum standards have been set up for insulating materials that go into Pole Star distribution transformers, and thorough testing by the roller electrode method is your guarantee that these standards are being met. Each insulation manufacturer's material must pass acceptance tests before being approved for Pole Star insulation, after which batch checks keep the quality of the material under constant surveillance.

POLE STAR pt

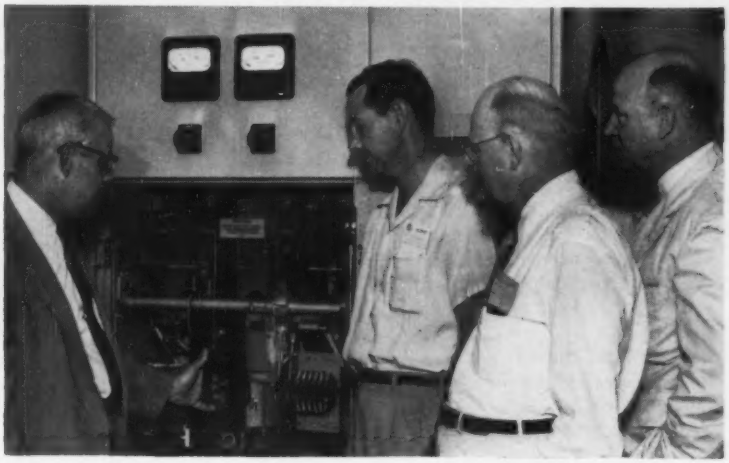
167 Production Controls make POLE STARS best!

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** *Greater Pittsburgh District*

Pole Star Transformers are available in all standard single phase distribution sizes from 3 through 500 kva, through 67,000 volts.

Mobile Exhibit . . .



Displays Electrical Equipment as . . .

I-T-E Starts Rolling on U.S. Tour

Customers and prospects of I-T-E Circuit Breaker Co are getting an "in the flesh" preview of the firm's major electrical products. A mobile exhibit that recently took the road on a year-long nation-wide tour carries a cross-section of I-T-E's line of electric protection, transmission and distribution equipment.

The 33-ft demonstration trailer is equipped with its own generating system to operate displays, lighting circuits, radiant heating and air conditioning. Attendance at stopping points is by invitation from the company's nearly 50 field offices.

Included in the exhibit are products such as operable 15-kv switchgear; new isolated phase bus; l-v drawout switchgear; and smaller components. For equipment that didn't fit aboard, wall-mounted photo books, colored murals, and an electrical system diagram from generation through utilization are being shown. To display the diagram and color transparencies, a 4 x 12-ft shadow box with three panels is mounted along one wall.

Last week the trailer was at Memphis, Tenn., and Pine Bluff, Ark. In the photo, George Hoffman, left, I-T-E's southern regional manager, explains features of circuit breaker to, left to right, W. A. Harris and R. J. Rhinehart, Arkansas Power & Light Co, and T. M. Salisbury of Gregory-Salisbury, local I-T-E representative. This week, July 30 to Aug. 3, finds the exhibit in the Chicago area. From Aug. 6-10 it will visit Hammond, Ind., and Milwaukee, Wis., then head westward.

A-C Supplies Co-op with Big Mobile Sub

One of the largest of its kind built by Allis-Chalmers Pittsburgh Works, a 28-ft long mobile substation recently went into service for Brazos Electric Power Cooperative, Inc, Waco, Tex. The 13½ x 8-ft sub has a 2,500-kva, 3-phase, 60-cycle, 55C rise, oil-immersed, forced-oil, forced air-cooled transformer with internal high and low-voltage switches, external high-voltage disconnect switch, high and low-voltage protective devices and terminal facilities.

The unit transforms 69-kv to service voltage combinations through series multiple, delta-star switches. Allis-Chalmers says this makes it possible to get required low voltages (2,540, 4,400Y/2,540, 7,620 and 13,200Y/-7,620) without adjustment through the main transformer tank's hand holes.

Shipbuilding Firm to Build Reactor Tank for A-Plant

New York Shipbuilding Corp of Camden, N. J., received a $2-million contract from General Electric Co to construct a welded steel atomic reactor tank. This pressure vessel, reported largest of its type, will be built for Commonwealth Edison Co's 180,000-kw Dresden nuclear power station.

The pressure vessel will have a 5-in. thick carbon steel welded assembly with a ⅜-in. stainless steel cladding over the inside.

Dimensionwise, the cylindrical vessel will be 12 ft 8 in. inside diam, be about 42 ft high, weigh approximately 400 tons, and have a capacity of about 278,000 lb of water. It will stand upright inside a 190-ft diam steel sphere.

The vessel will be designed for an operating pressure of 1,000 psi, an operating temperature of 544.6 F, and engineered to have an operating life of 40 years.

(*More M & M on page* 56)

Seniors Get 'Reliance' Awards

Rome Cable's community betterment plan recognizes high school students who do 'most they can with best they have'

Hard-working, intelligent high school seniors in Rome, N. Y. are enthusiastic about a year-old community service program sponsored by Rome Cable Foundation. The seniors can aim for Self-Reliance Awards which are presented not solely on the basis of grades but on qualifications like working ability and resourcefulness as well.

The annual contest was established to "recognize the student who is doing the most he can with the best he has." The city's Junior Chamber of Commerce handles administration and the Foundation, formed in 1952 by Rome Cable Corp., provides the financing.

This June, eight youths out of 97 applicants shared $1,300 in awards. All seniors of Rome's schools are eligible to compete. Winners are chosen on the basis of a satisfactory scholastic standing, work done in school and church organizations, work done for pay, resourcefulness with time and money, and character.

A. D. Ross Fraser, Foundation president, stated at the awards banquet that while graduating seniors receive many academic honors, students who show self-reliance should be recognized too. "We feel that the young people who recognize the value of work, thrift, religion and making the most of their time will be the Americans best fitted to continue our nation's progress in the future."

Fraser appealed to 150 of the city's leaders and the 22 finalists "to continue to be a people seeking opportunity, not security." He cited examples of self-reliance in U. S. history, including the birth of Rome Cable Corp in the lean times of 1936.

"We are proud and happy to recognize these young people," Fraser added. "This program of self-reliance awards . . . is one which any company, large or small, can adopt in its own community. We . . . urge other businesses to do their part in this endeavor."

The program, acclaimed by Freedoms Foundations of Valley Forge, originated at Armco Steel Corp of Middletown, Ohio, three years ago. The Rome plan was established on a three-year trial basis.

Burndy Factory-Fills Clamp Connector With Compound

To eliminate job application of a joint compound, Burndy Engineering Co will market a clamp-type connector with grooves filled with an aluminum oxide-inhibiting compound.

Recent utility investigations on causes of electrical connection failures pointed mainly toward neglect to use a joint compound, stated I. Matthysse, chief engineer of Burndy's Utility-Industrial Division. This difficulty in aluminum-to-aluminum or aluminum-to-copper connections could be solved,

Matthysse said, by factory-filling the connector grooves with compound. A good compound must be applied in sufficient quantity to fill all voids and be forced between strands of the conductor by contact pressure, he added.

The problem of sealing the compound in contact elements until ready for use was solved by a plastic dip process. This provides a seal without melting the joint compound or filling in small crevices that would make stripping difficult. This development, known as Stripseal, will permit plastic to be peeled off rapidly with the pull of a rip tape. In the illustration, plastic dip ends are being removed by rip tape, and connector with compound is ready for installation.

The technique offers advantages in addition to saving a lineman's time and difficulty, Matthysse maintained. Connectors have clean oxide-free contact surfaces, and use of specified compound (Penetrox A in most cases) is assured. But dry-scratch brushing of aluminum conductors will still be required to remove oxide film before the conductor is put in connector, he said.

Mid-Span Vertical Spacer Developed By Hendrix

A one-piece "between-poles" spacer for vertical secondary circuits and "mid-span" service taps has been announced by Hendrix Wire & Cable Corp.

The device will permit greater pole setting distances with energized, uninsulated conductor, engineers of the Boston, Mass., company said. It eliminates erection of poles for installation of service drops, they added. Molded in one piece of acrylic resin, the spacer accommodates conductors up to 0.580 in. diam.

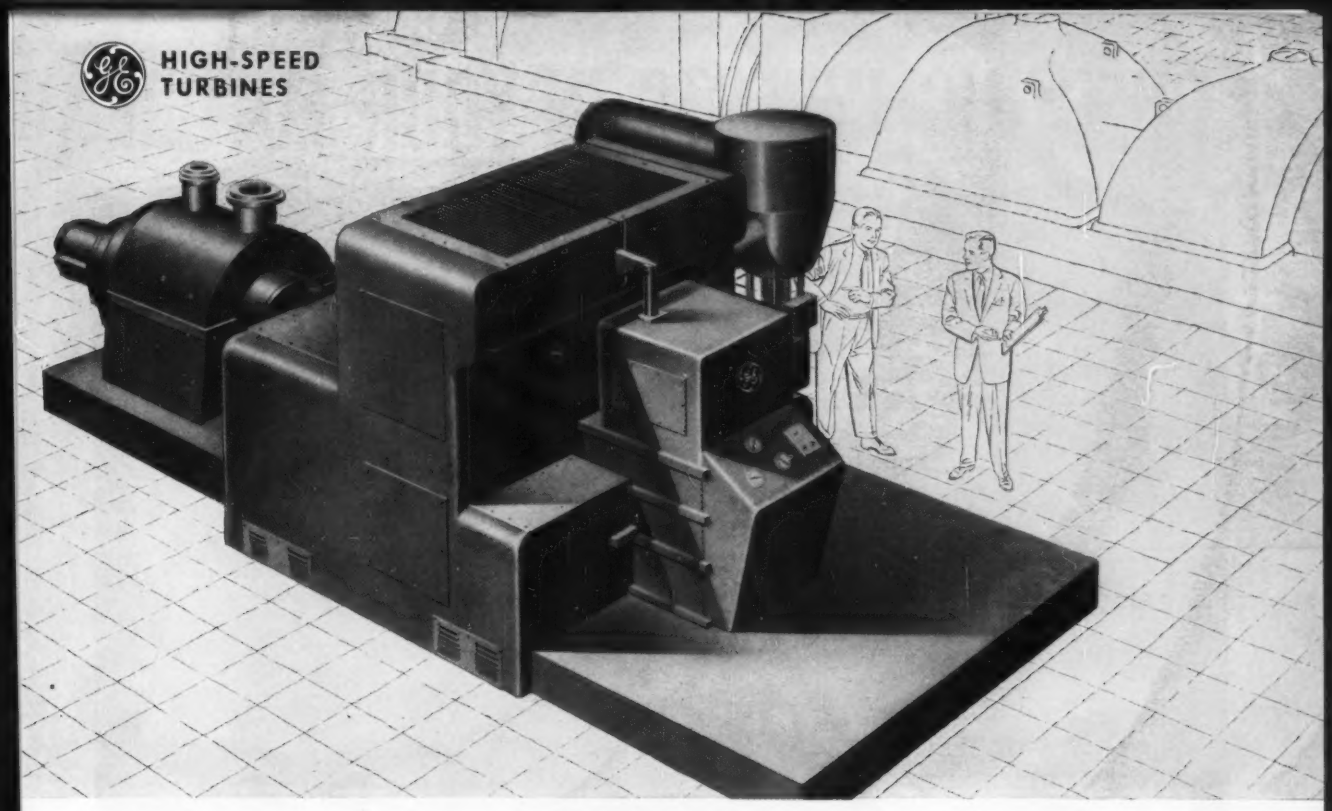
S. Morgan Smith Co to Build 143,000-Hp Hydro Units

S. Morgan Smith of York, Pa, will build three 280-in. Kaplan turbines for a U. S. Army, Corps of Engineers project. Installation will be at Ice Harbor Lock and Dam on the Snake River, about 12 miles from Pasco, Wash., according to a recent announcement by the company.

The turbines will operate over a head range of 78 ft to 102.5 ft. Each is to be rated 143,000 hp at 90 rpm under an 89-ft head. These reportedly will be the world's most powerful Kaplan turbines, surpassing the McNary Dam units each of which is rated 111,300 hp under 80-ft head (EW, June 18, 1956, p. 56).

Shipment of the embedded parts for Ice Harbor Lock and Dam is scheduled to start December 1, 1958, with completion of the third unit, July 1, 1960.

(*More M & M on page* 59)



With G.E.'s new turbine drives for boiler feed pumps . . .

Up to 40% of auxiliary electrical power can now be released as salable kilowatts

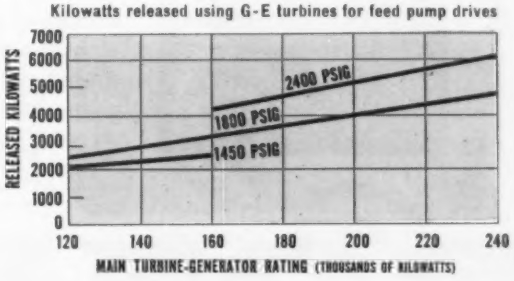
In today's larger-capacity, high-pressure steam stations, motor drives for boiler feed pumps require as much as 10,000 hp—a heavy drain of auxiliary electrical power. To release this power as salable kilowatts, General Electric now offers a new line of high-speed turbines—specifically designed for 4000 to 10,000 hp boiler feed pump service.

Savings in auxiliary electrical power can be as high as 40% with the application of these G-E turbines. Auxiliary system voltage can often be reduced from 4160 to 2400 volts, with considerable savings through lower transformer and circuit breaker ratings.

G-E turbines provide direct drives at speeds up to 9000 rpm. At half load or above, the variable-speed turbines can also improve net station heat rate by eliminating transmission losses and throttling losses across feed valves.

Over the past 25 years several utilities have operated G-E turbines in boiler feed applications. More recently, the development of economical high-speed pumps for large-capacity boiler feed service has broadened the range of applications for turbine drives.

If you are now contemplating system capacity increases of 100,000 kw or more, be sure to ask your Apparatus Sales Representative about G-E High-speed Turbines for boiler feed applications. Or write to General Electric Company, Section 241-6, Fitchburg, Mass.



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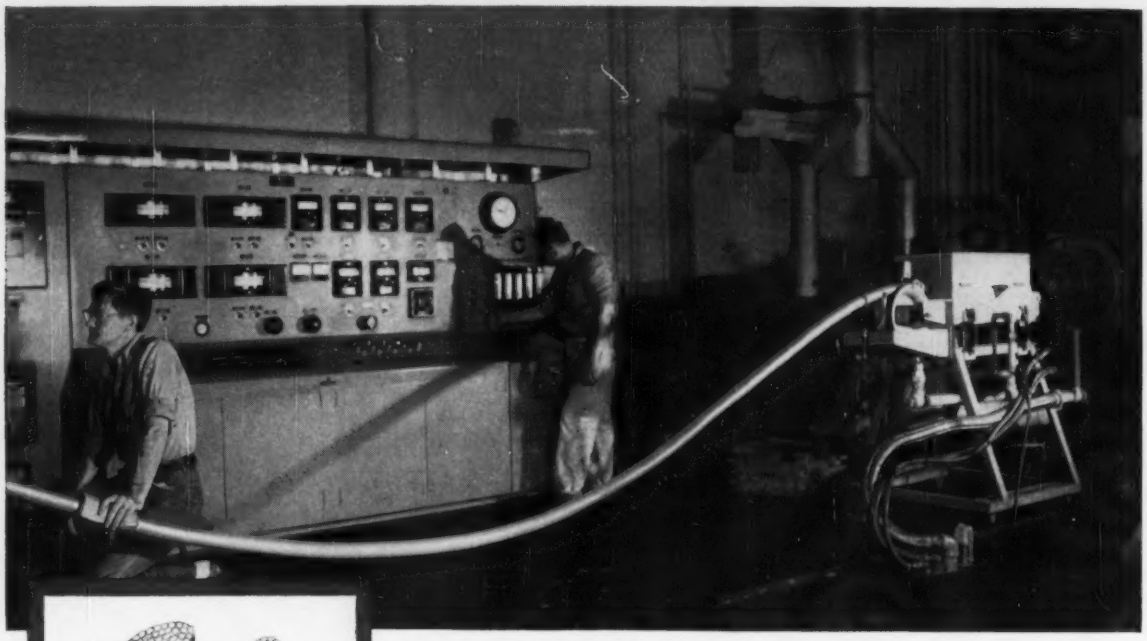

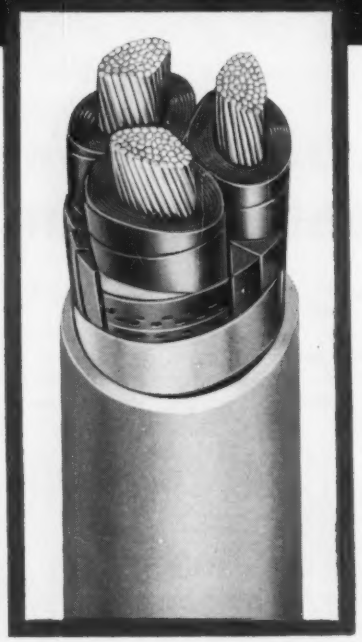

New continuous lead extrusion press vastly improves "paper and lead" cable sheathing

THIS NEW CONTINUOUS LEAD EXTRUSION PRESS and control board revolutionize the extrusion of sheathing for Paper Insulated Cable. Because its operation is continuous there are no press stops, no recharging and, of outstanding importance to you, *there are no charge welds.* In addition, the control board, shown at the left, automatically controls and records all temperatures. Every inch of the resultant cable is just like every other inch...the "paper and lead" cable sheath is perfect in its concentricity, physical properties and general uniformity.

This press is the finest obtainable today. It is only part of Roebling's program of modernization for producing electrical conductors of modern, high quality.

Our engineering and metallurgical staffs are always glad to consult with you on your individual cable problems. A letter or phone call will bring action.

ROEBLING ELECTRICAL WIRES AND CABLES ARE AVAILABLE WITH EITHER COPPER OR ALUMINUM CONDUCTORS

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GE System Drives Wind Tunnel

Using enough power to supply the needs of about 650,000 homes, Cleveland, Ohio's supersonic wind tunnel began tests on aircraft and guided missile propulsion systems recently. The 10 x 10-ft tunnel is powered by a unified General Electric Co electric system which includes the interlocked armored cable at right, seven wound-rotor induction motors with a total rating of 250,000 hp, and a substation with 3,344 capacitors.

The cable, varying from 600 v, No. 4 AWG for three conductors to 15 kv, 2.5-million CM, single conductors, totals about 7 miles in length. Four wound-rotor induction motors mounted on a single shaft turn the main compressor. Each is rated 37,500 hp, 875 rpm, and uses 3-phase, 60-cycle current at 6.6 kv. Three similar 33,334-hp motors turn the secondary compressor when air stream speeds above two-and-one-half times speed of sound are used.

The GE-designed substation steps down power from 138 kv to 6.9 kv. A bank of 3,344 capacitors with total rating of 83,600 kilovars has provided power factor, the company says, of 97%.

Operated by the National Advisory Committee for Aeronautics at Lewis Flight Propulsion Laboratory, the supersonic tunnel has a demand of 200,000 kw when tests are run at three-and-a-half times the speed of sound. Additional power is needed to operate the exhauster before and after tests and to regenerate the air dryer.

"This concentration of load necessitated tailor-made equipment," GE spokesmen said, to not inconvenience other electric users in the area. The tunnel operates mostly at night.

Harvey Aluminum Finalizes Plans for Its Dalles Plant

Harvey Aluminum of Torrance, Calif., reports that all financial and contractual arrangements have been finalized for construction of the company's 54,000-ton aluminum reduction plant at The Dalles, Oregon.

Harvey Machine Co., Inc., of which Harvey Aluminum is a division, has borrowed $44 million for the project from the Bank of America, Chase Manhattan Bank, and First National City Bank of New York, according to an announcement. The loan includes provisions for additional working capital of up to $10 million, and later another $25 million under certain terms and conditions.

Work at the 500-acre site at The Dalles, interrupted four years ago, will resume about August 1. The plant is scheduled for completion late in 1957.

U. S. Aluminum Production

Primary aluminum output in the U. S. was 810,304 tons for the first half of 1956. This is 13% over the same period in 1955, and establishes a new production high, according to the Aluminum Association, New York. June output was 145,726 tons, down slightly from the record-breaking May total of 150,800. Last year's June figure was 127,632. Association Secretary Donald M. White said production facilities have increased more than 100,000 tons since January, virtually assuring new production records in coming months.

U. S. Copper Production

U. S. production of primary copper was 95,105 tons in June, according to the Copper Institute, New York. This is 3,000 tons under May total, and is the lowest output figure so far this year. For the first six months of 1956, production totaled 574,551 tons. Refined copper output amounted to 133,543 tons in June, *vs* 142,445 tons produced in May. June deliveries to fabricators dropped to a low for the year of 128,573 tons compared with 140,587 tons in May. Refined stocks hit a new high of 57,546 tons in June, up from 53,443 tons in May.

M & M BRIEFS

Philco Corp of Philadelphia, Pa., developed the Audipage, a one-ounce receiver for personal use such as in plants where conventional public address systems are impractical. Smaller than a cigarette lighter, Audipage operates on the principle of magnetic induction. Its sound is received through a small flesh-colored earpiece which can be heard only by the wearer.

Trane Co, LaCrosse, Wis., reports total shipments are currently 45% ahead of a peak 1955. Manufacturer of air conditioning, heating, ventilating and heat transfer items, the firm will have added 250,000 sq ft of space by year's end.

Nippert Electric Products Co of Columbus, Ohio, is producing a copper-zirconium alloy. Containing 0.25% zirconium, the alloy is reported suitable for motor commutators operating at temperatures above 500 F and at high stresses. Rupture strengths have been exhibited from 32,000 to 41,000 psi. This alloy was developed at Battelle Institute, Columbus, Ohio.

BUSINESS OUTLOOK

Electrical World
JULY 30, 1956

The steel strike has lasted long enough to have an impact on business activity in the fourth quarter. The halt in steel production during July is, in itself, enough to pull the industrial production index down by about 5%.

Beyond that, some steel-consuming industries have been forced to curtail activities as their inventories have dwindled during the strike. Construction has been most seriously affected. Builders had a difficult time getting hold of many types of structural steel even before the strike. They could not, therefore, hedge against a month-long famine. This has forced a temporary delay in many of industry's extensive modernization and expansion programs.

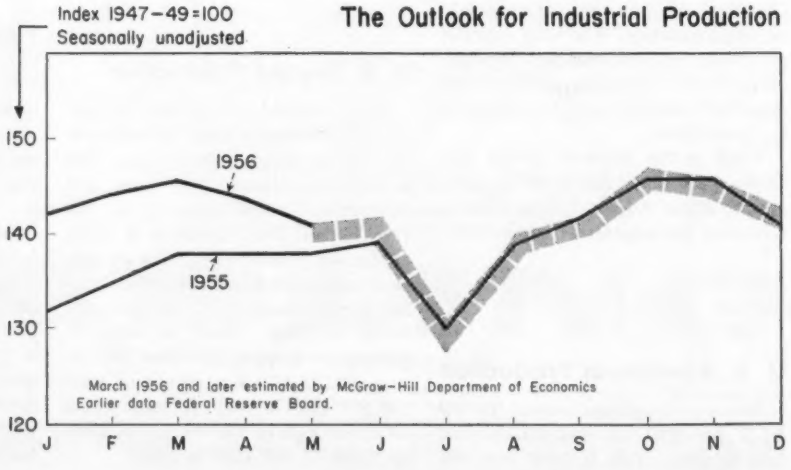
A return to normal steel production will, however, swing the economy into a new high level of production. Inventories of most types of steel will be low by the time the mills get into full operation again. This should touch off a flurry of new orders not only from the firms that are now hard-pressed for steel, but from steel-consuming industries generally.

• • •

Inventory build-up in the fourth quarter may be an important factor to help push the nation's output of goods and services to a new high. During the second quarter of the year, GNP reached an annual rate of $405 billion. The rush of business now building up for the fall should carry it well over the $405 billion mark in the final quarter.

The steel settlement is sure to lead to price increases. But it is not likely to lead to inflation—that is, to a sudden and sharp rise in the general price level. **Consumers of steel will pay 5% to 10% more a ton.** But the secondary price impact on products using steel probably will not go much beyond the capital goods industries, which are operating near capacity on hefty backlogs.

But manufacturers of consumer goods may have to absorb a large part of the increased costs themselves. Personal income continues to hit new highs. But consumers are spending it cautiously. They have been especially reluctant to buy autos and appliances. So, if manufacturers are to woo the consumer this year, they probably can't tack on a price increase large enough to cover increased costs.



NEW!

Major new development in bus conductor offers maximum protection against short-circuit forces in high-current systems.

Strong as a girder, easy to install, high in current-carrying capacity, Alcoa® Aluminum Integral-Web Channel Bus Conductor offers pronounced advantages over other types of conductor for such applications as generator leads, substation bus and industrial plant use.

Its integral-web construction eliminates need for spacer clamps or welded bars across channels. The special extruded shape gives a large surface area to accommodate high current in either ac or dc circuits. Its high section modulus provides the mechanical stiffness needed to resist the forces of short circuits without damage or distortion.

Joints, taps and splices can be clamped, bolted or welded. Special grooves mark exact center lines for drilling bolt holes so that nuts lock in recesses designed to eliminate back-up wrench. Channels, plus vent holes in center web, provide high degree of ventilation, cooling and drainage.

For complete information, contact your Alcoa repesentative or write Aluminum Company of America, 2306-G Alcoa Building, Pittsburgh 19, Pa.

SIZES	NOMINAL CURRENT* (amperes)
4 x 6	3,500
5 x 6	4,000
8 x 8	7,000
11 x 11	10,000
12 x 12	12,000

*(based on 30° C rise above 40° C ambient still air)

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ALCOA ALUMINUM
ELECTRICAL CONDUCTOR
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

Labor in Last Ditch Battle on Niagara

New York labor organization wants free enterprise power development, says labor agreements with government agencies are "almost impossible"

The chips were down in the five-year battle for free enterprise power development on the U. S. side of Niagara Falls. The Senate had passed a bill for state development. The house Public Works Committee had cleared the state bill after electric company representatives had urged modification. It was then that the New York State Association of Electrical Workers moved to the front.

Taking a full-page ad in the New York Times, the AFL association addressed an open letter to all House members. In vigorous, unmistakable language it put labor's case for free enterprise development of Niagara on the line. Examples:

> **"Past experience shows that fair and lasting labor agreements with government agencies are almost impossible; organized labor has, and is reaching excellent agreements today, with business-managed electric utilities. We want to continue that way."**
>
> **"Hundreds of thousands of International Brotherhood of Electrical Workers members earn their livelihood and support their families as employees of the free enterprise system in the light and power industry. And hundreds of thousands of other citizens receive an income from their investments in the power companies. Truly this is one of the basic industries in the country. On its record it deserves to be protected."**
>
> **"As members of organized labor we do not propose to have our welfare directed or determined by any bureaucratic official of the government, whether it be municipal, state, or national, no matter how good the intention may seem to be. Government ownership would tend to make the American worker a servant to his government; whereas his government should be a servant to him."**

The State Association as well as other labor organizations have been in this fight since the first hearing on Niagara development. Labor's recent action is not that of a Johnny-Come-Lately, but rather that of a dependable battler who won't be beat.

The final outcome of Niagara legislation is still to be written. Even if the House passes the State bill, it must still clear the President's desk. Right now the prospects for free enterprise development of Niagara are dim. But they would be much dimmer had not labor pitched into this last-ditch fight.

TECHNICAL NOTES

Very tall structures act like a needles during lightning storms to stress adjacent air to the rupture point.

IQ of automatic dispatch systems today is not high enough to decide when to bring on or shut off turbine generators.

Aluminum cable should be loaded, for economy, below the rating of its copper equivalent. Savings in the conductor metal justify operation at a lower current density.

Generating economy of large units can be achieved by small systems if they interconnect and plan their generating additions cooperatively with each company buying an equitable share of the more efficient new unit's output.

Upward streamers from level ground are rare during lightning storms, but transmission towers may be high enough to initiate the streamers.

Lighting failure is conducive to panic in time of danger, sometimes contributing to extensive loss of life for fire in theatres or other meeting places.

Inorganic insulation on cable must be held at lower temperature than is permitted for the same insulation in rotating machines and transformers because of cable movement caused by longitudinal expansion in the cable run.

Steam power plants of single-level design avoid complicated foundation problems and cut construction delays from work interferences.

Salmon, eels, and other game fish sometimes have considerable influence on selection of hydro turbines.

Higher ampacity in limited cable ducts is attainable by using silicone-rubber-coated, glass-tape insulation instead of conventional varnished cambric or impregnated paper.

Priest Rapids Contract Let

Merritt-Chapman & Scott Corp, New York, will build 630,000 kw hydroelectric plant on the Columbia River

Following receipt of the net proceeds of a $166-million revenue bond issue, the Grant County PUD of Ephrata, Wash., has awarded a $91,878,625 contract to Merritt-Chapman & Scott Corp of New York for construction of Priest Rapids Dam on the Columbia River.

The PUD received checks totaling $160,907,027 from a syndicate of 228 underwriters headed by Halsey, Stuart & Co, John Nuveen & Co, B. J. Van Ingen & Co, and Blyth & Co.

Largest Contract Awarded

The contract awarded to the New York firm is believed to be the largest ever made to a single contractor. It calls for the construction of an 8,412-ft long dam of reinforced concrete and earthfill, with an installed generating capacity of 630,000 kw. The PUD will award other contracts totaling some $8 million for other construction and equipment for the project.

In addition to Priest Rapids, the PUD has been licensed by the FPC to build a second hydroelectric installation of approximately equivalent size about 18 mi upstream. Construction of this second project, known as Wanapum Dam, is expected to be started in about two years under a separate contract.

Two Dams: 1.2 Million Kw

The two dams will have a combined generating capacity of 1.2-million kw, exceeded in the United States only by Grand Coulee and Hoover dams.

The Priest Rapids development is unique in that it is being financed by the sale of 49-year revenue bonds to be retired through the sale of power. No tax money or government appropriations are to be used for its construction, although project was surveyed first by Corps of Engineers and was approved by Congress for 100% federal financing. Twelve public and private utilities in Washington and Oregon have signed 50-year contracts with the Grant County PUD for the purchase of 63.5% of the power generated by the development. Under their contract, they also agreed to be responsible for the same percentage of the annual cost of the dam, including debt retirement service.

Under the allocation plan, the PUD retains 36.5% of the total power, or about 230,000 kw, for its own use.

The purchasers of Priest Rapids power also have an option to buy an equivalent percentage of the power to be generated by the Wanapum development.

Project Promoted for 6 Years

The PUD has been promoting the project for six years, under the leadership of Manager Glenn Smothers. Construction is expected to require about four years, under the supervision of the Harza Engineering Co of Chicago, which designed the project. At peak of construction 3,000 men will be employed.

Merritt-Chapman & Scott was given a letter of intent by the PUD shortly after construction bids were opened Mar. 12 (the firm was low of five bidders), and it has established a field office at Ephrata. Construction is to start immediately.

Detroit Ed Establishes New Water Heating Rate

Detroit Edison Co's new water heating rate provides for 20-hour charging period—off 5 pm to 9 pm. It also provides for higher wattage heating elements.

Rate is a flat rate—$3.88 per month for 50 gal, $5.33 for 80 gal, and $6.79 for 110 gal.

Old rate provided 10-hr charging period only with 2,500-watt lower and 3,500-watt upper elements and rates $3.15, $3.55, and $5.60 for 50, 80, and 110-gal heater.

The company is working on three tank sizes, 50 gal, 80 gal, and 110 gal, eliminating 60 gal sizes. All water heaters will have two heating elements. Lower element size depends on tank size and will be 2,500 watt for 50-gal tank, 3,500 watt for 80-gal tank, and 4,500 watts for 110-gal tank. Upper element for all tanks will be 4,500 watts and will be connected to the regular house meter. Upper and lower elements of the water heater are interlocked so they can't both come on at the same time.

This new rate provides 25% increase in monthly rate, double the charging hours and the quick recovery feature. New rate became effective on July 1.

Wisconsin PSC Issues Normalized Tax Order

The Wisconsin Fuel & Light Co has received an order from the Public Service Commission of Wisconsin to normalize taxes by charging to the depreciation accrual the difference between straight-line taxes and those taxes resulting from the use of liberalized methods.

The Wisconsin commission in its order said:

1. "That Wisconsin Fuel & Light Co shall charge to depreciation expense and credit to depreciation reserve, in addition to depreciation computed in accordance with the depreciation rates certified in this docket on Jan. 29, 1954, an amount equal to the reduction in federal income taxes effected by use for federal income-tax purposes of the liberalized depreciation provisions of Section 167 of the 1954 Internal Revenue Code.

2. "That the amount of such additional depreciation provision shall be credited to a separate subdivision of the reserve for depreciation until further order or direction of the commission."

As to the company's request for a ruling on the rate-making aspects of the company's accounting proposals, the PSC said in part that this "is answered by Section 196.09 (5), Statutes, which provides, in effect, that when the commission has determined the depreciation expense for a utility, such determination shall be used in a proceeding involving the rates of the utility."

This feature appears on this page every two weeks.

Future Financing

(Furnished by the Irving Trust Co from the "Financing Calendar")

Electric and gas utilities have scheduled $175 million new issues for August.

Thus far issues totaling $130 million are scheduled for September. These are well spaced and no "log-jams" are apparent.

Telephone financing seems to be dominating the fall securities market. Just one week after the sale of $250 million debentures American Telephone & Telegraph Co announced plans for selling $575 million common stock. Stock will be offered to stockholders in October on a 1-for-10 basis. This is the largest offering to stockholders on record. Other issues scheduled for sale by telephone companies are:

August—Pacific Telephone & Telegraph Co, $78 million debentures and $156 million common stock (90% to parent company) . . . New England Telephone & Telegraph Co, $61 million common stock (69% to parent).

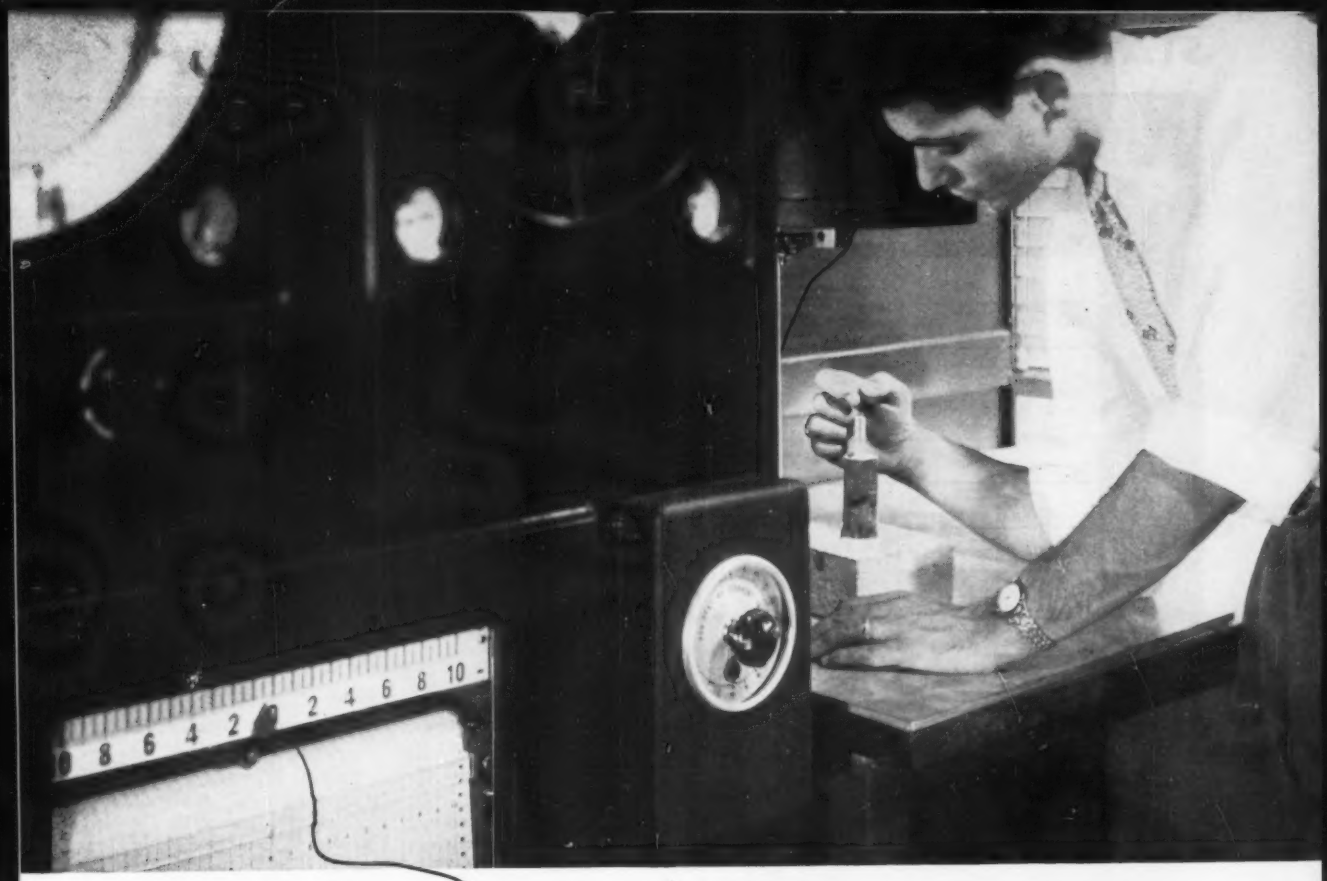
September—General Telephone of California, $20 million first mortgage bonds.

Financing planned by electric and gas companies for the last five months of 1956 amounts to $800 million. At this time only 11% of the total is expected to be in equity securities. These utilities are doing far less financing with equity issues than they have in prior years. This is rather surprising when the 1956 bond market and securities markets are studied.

Due Diligence Meetings:
August 10, Consumers Power Co; August 21, Consolidated Natural Gas Co; August 27, Tampa Electric Co; August 31, Southern California Edison Co; September 5, Gulf States Utilities Co; September 18, Virginia Electric & Power Co; September 28, Columbia Gas System, and October 15, Ohio Power Co.

DATE	COMPANY	Amount of Offering (millions) DEBT	EQUITY
AUG. 1	Michigan Wisconsin Pipeline	$25.0–C	$
1	El Paso Natural Gas	.....	25–N Pfd
7	New York City Housing Authority	76.7–C	.....
14	General Acceptance Corp	20.0–N	.....
14	Consumers Power	40.0–C	.....
17	Central Illinois Light	.....	8.0–N Pfd
21	Pacific Telephone & Telegraph	78.0–C	15.6– –rt COM (a)
28	Consolidated Natural Gas	30.0–C	.....
29	Tampa Electric	10.0–C	.....
30	New England Telephone & Telegraph	.....	19.0– –rt COM (a)
AUG. No Date	Detroit Edison	59.8– –cv–rt	.....
	Boulder Acceptance	.....	18.0–N COM
SEPT. 5	Southern California Edison	40.0–C	.....
10	Gulf States Utilities	16.0–C	4.2–C COM
12	Northern States Power	15.0–C	.....
13	General Telephone of California	20.0–C	.....
25	Virginia Electric & Power	20.0–C	.....
SEPT. No Date	Pennsylvania Tunnel	25.0–C	.....
	Florida State Turnpike Auth	185.0–N	.....
	Jacksonville Expressway Auth	70.0–	.....
	Proctor & Gamble	70.0–N	.....
3rd Quarter of 1956 (Month not indicated)	California Toll Bridge	34.0–C	.....
	South Carolina Electric & Gas	5.0–P	.....
	Rochester Gas & Electric	.....	5.0–N–Pfd
	Texas Eastern Transmission	.....	15.0–N Pfd
	U. S. Governments	0/3,000.0–*	.....
	Kansas Nebraska Natural Gas	5.5–P	.....
	U. S. Rubber	50/60.0– –cv–rt	.....
	CIT Financial	75.0–N	.....
	Dade County, Florida	34.5–C	.....
	City of Dallas	40.7	.....
	Washington State Toll Bridge	227.0–C	.....
	Oklahoma Turnpike	63.0	.....
	Long Island Lighting	.....	12.0–N Pfd
	Kaiser Steel	100.0–P	.....
	Arizona Public Service	8.0–P	.....
	North Carolina State School	25.0	.....
OCT. 3	Columbia Gas System	25.0–C	.....
9	California Electric Power	8.0–C	.....
16	Public Service of Indiana	30.0–C	.....
17	Ohio Power	28.0–C	6.0– –Pfd
OCT. No Date	Delaware Power & Light	.....	6/8.0–C Pfd
	North–South Indiana Toll Road	220.0–C	.....
	Alabama Gas	7.0–P	.....
	American Telephone & Telegraph	.....	575.0– –rt COM
NOV. 13	Metropolitan Edison	10.0–C	.....
27	Carolina Power & Light	15.0–C	.....
NOV. No Date	Transcontinental Gas Pipe Line	20.0–P	.....
	Long Island Lighting	20/25.0–C	.....
	New England Power	10.0–C	.....
DEC. 3	U. S. Governments	9,100.0– –R	.....
DEC. No Date	Appalachian Electric Power	24.0–C	.....
	Essex County Electric	20.0–C	.....
4th Quarter of 1956 (Month not indicated)	Tennessee Gas Transmission	50.0–N	.....
	Kansas City Power & Light	20.0–C	.....
	Texas Eastern Transmission	15.0–N	.....
	Otter Tail Power	5.0–N	.....
	Northern Natural Gas	20.0–N	.....
	Philadelphia Electric	30.0–C	.....
	Southern Union Gas	.....	3.0– –rt COM
	Columbus & Southern Ohio Electric	.....	some Pfd
	U. S. Governments	0/2,000.0*	.....
	North American Aviation	.....	40.0–N–rt COM
	Central Vermont Public Service	1.8–N	0.7–N COM
	American Louisiana Pipeline	.....	15.0–C Pfd
1956 (Month not indicated)	Texas Gas Transmission	28.0	.....
	Grand River Dam Auth., Okla	27.0	.....
	Southern Nevada Power	7.0–C	.....
	Hawaiian Electric	.....	5.0–N Pfd
	Michigan Bell Telephone	30.0–C	.....
	J. P. Stevens	30.0–N	.....

Symbols: C—Competitive; N—Negotiated; P—Private; R—Refunding; cv—convertible; rt—Rights; Pfd—Preferred; COM—Common. (a) Does not include amount to be offered to parent company. *Estimated. **Approximate date.



Keeping track of

$5Al_2O_3.2MgO.24SiO_2.6H_2O.Na_2O.CaO$

...in Insulator Raw Materials

The complex formula above stands for "Montmorillonite", one of a group of highly plastic minerals present in the clay which is a component of every insulator. As these little known minerals contribute properties to the clay which are most important when it is formed into insulators for your power system, it is necessary to determine their presence and quantity in raw materials coming to us from the mines.

In the past, it has been difficult to make fast, positive identification of these fine clay fractions . . . even by such means as the petrographic microscope and X-ray diffraction.

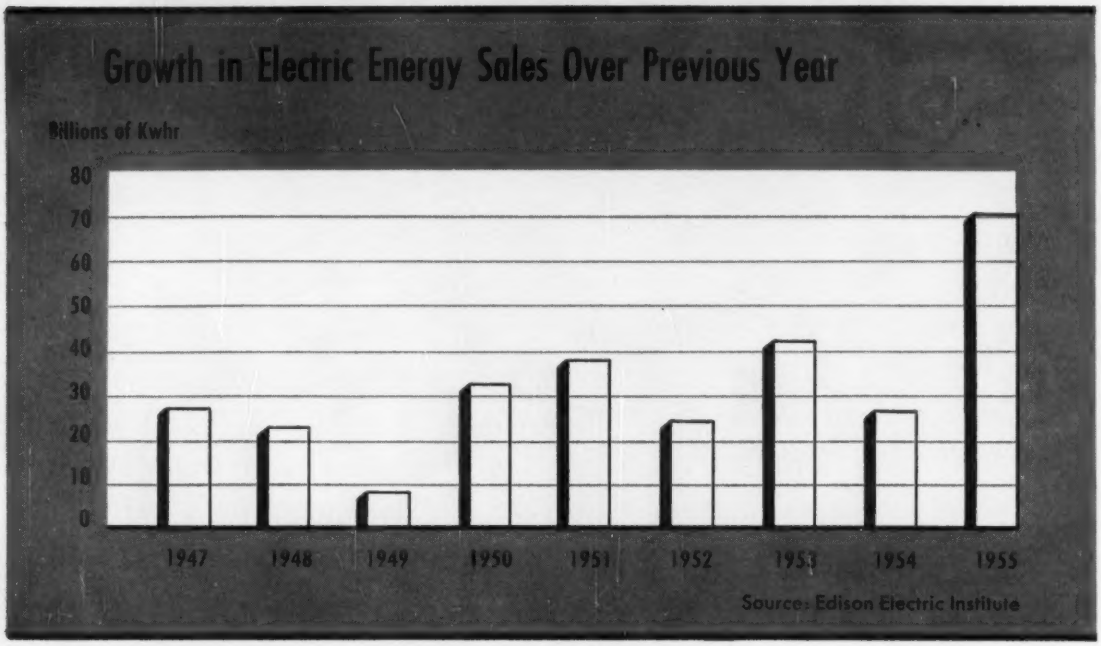
Today, however, General Electric is pioneering the application of Differential Thermal Analysis (DTA) in this small but important phase of Locke* insulator manufacture. DTA is a reliable system for determining minerals in ceramic materials by interpreting differences in heat absorption and emission during firing between a test sample and a known inert material. These are recorded by the graph you can see in the photo. With DTA, another scientific method is added to mass production of fine electrical porcelain.

DTA is another illustration of the extremes to which we go to make sure you get Locke insulators of uniform density, high mechanical strength, dimensional accuracy and long service life. Insulator Department, General Electric Company, Baltimore, Maryland.

*Registered Trademark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity } Peak—Class I Systems } million kw	May	117.43	116.78	106.32	10.4
	April	91.4	92.3	82.4	10.9
Estimated Dec. '56 Peak	May	106.00	105.88	103.44	2.5
Production—billion kwhr	May	49.09	47.49	43.35	13.2
Hydro		11.70	11.55	9.81	19.3
Fuel		37.39	35.94	33.54	11.5
Sales—billion kwhr	April	44.51	45.36	39.53	12.6
Residential		11.82	12.42	10.60	11.4
Commercial		6.70	6.84	6.15	8.9
Industrial		23.53	23.69	20.42	15.2
Other		2.46	2.40	2.36	4.2
Fuel Consumption	May				
Coal—million tons		12.05	11.95	10.76	12.0
Oil—million barrels		4.47	5.76	4.88	−8.4
Gas—billion cu. ft		110.51	89.72	103.43	6.8
Net Income Class A & B Co's—$ million	May	103.15	115.46	92.7	11.3
Residential Customers—millions	12 mos.	44.76	44.67	43.51	2.9
Revenue per kwhr	ended	2.62¢	2.63¢	2.67¢	−1.9
Avg kwhr per customer	April 30	2,838	2,819	2,623	8.2
Avg annual bill		$74.36	$74.12	$70.01	6.2

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	June	141	141	139	1.4
ENR Construction Cost	July	145.6	145.1	138.4	5.2
BLS Cost-of-living	June	116.2	115.4	114.4	1.6
NEMA Sales	April				
Insulation materials		163	168	160	1.9
Electric appliances		111	120	102	8.8
Wholesale prices	April				
Motors and generators		130.4	126.9	120.5	8.2
Transformers and regulators		135.3	133.1	127.3	6.3
Switchgear and fuses		149.0	147.8	135.5	10.0
GNP—annual rate—$ billion	1st Qtr.	398.5	397.3	375.3	6.2

WHEN MOISTURE PROTECTION IS VITAL

MOLONEY Subway Type Network Transformers... Water-proofed with Asphaltum Paint and Heavy Underseal

Installed in dank, disagreeably moist underground vaults, network transformers must be thoroughly protected against condensation, flooding, sewage, salt, and manufacturing wastes. That's why Moloney Subway Type Network Transformers have thick coats of asphaltum paint and heavy protective underseal *. . . for maximum protection against corrosion.*

Specify Moloney Subway Type Network Transformers. They're engineered to provide dependable, continuous service—for your network system.

ME56-16

Moloney Network Switch saves vault space.

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers • Network Transformers Series Street Lighting Transformers • Subway Transformers • Industrial Dry Type Transformers • Capacitors • Magnetic Components For Electronics

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Overload Protection

—without false alarms

Thermalite Indicators are unaffected by momentary overloads

When you see the bright indicator lights you know that overloads are nearing the limits of transformer capability . . . you know it's not a momentary overload. Regardless of ambient temperature, *Thermalite* device indicates excessive transformer operating temperature.

How it Works

A thermal element located in the top oil, safely away from all live parts, actuates a signal lamp circuit. The brilliant signal lamp remains lit until reset by the convenient external handle. *Thermalite* indicators do not interrupt service.

No time-consuming load surveys are needed because the clear signal of a *Thermalite* indicator can be seen from the cab of a service truck.

Stretch Transformer Dollars

You can utilize the inherent overload capabilities of your system when low-cost *Thermalite* indicators are used on your transformers.

Get them on Allis-Chalmers transformers 167 kva and smaller, 15 kv and below.

Call your nearby A-C office for information or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

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